

出國報告(出國類別：進修)

Nano Tech 2010, Tokyo 參加展覽會報告

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摘要

日本 Nano Tech 2010 於 2 月 17-19 日東京 Big Site 展場盛大舉行。此活動是目前世界上規模最大的奈米技術展覽與研討會。主要先進國家均參與此活動來進行奈米商機探討與技術交流。透過此展覽會不僅能了解全球奈米技術研發與商業化現況，更是一個尋找國際合作夥伴的重要平台。

本中心榮幸地能參與此奈米展覽會，展出中心今年三個主要研究成果：(1) 新一代汽車觸媒轉換器中蜂巢陶管表面覆蓋層(Washcoat)塗料與粉體、(2) 防水數位噴墨印刷相紙的漿料與粉體、及(3)大版面金屬板拋光用球形氧化鋁粉末。藉此展覽擺攤與各國的專家學者進行技術上的交流學習，並且參觀收集奈米粉體之相關研究資訊。

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一、 目的

本報告說明本人帶三名工作人員於 2010 於 2 月 17-19 日間參加日本國在東京 Big Site 舉行之 Nano Tech2010 Japan 之經過內容及收穫。

此展覽會自 2004 年成世界性展覽會後，目前已是世界上規模最大的奈米科技展覽與研討會。本中心自 2005 年起以獨立攤位“Particulate Materials Research Center, National Cheng University, Taiwan”參加展出。本中心攤位也是兩岸大學中唯一以大學研究中心名義參展者。其中 2009 年因經費不足未參加展出，但本人也前去，利用兩天時間關心與本中心相關之展出項目。

Nano Tech 2010, Tokyo 今年參觀人數為四萬兩千多人，來自全球的公司、機構以及國家主題館有 500 多家，展出的攤位達 800 個，研討會 50 場次。因此主要先進國家均積極參與此一活動來進行奈米商機探討與技術交流。透過展覽會不僅能了解全球奈米技術研發與商業化現況，更是一個尋找國際合作夥伴的重要平台。

本中心此次展出今年度完成之三個主要研究成果：(1) 新一代汽車觸媒轉換器中蜂巢陶管表面覆蓋層(Washcoat)塗料與粉體、(2) 防水數位噴墨印刷相紙的漿料與粉體、及(3)大版面金屬版拋光用球形氧化鋁粉末。前兩項目前已在國內完成技術授權進入商業生產。後者則預定在半年內授權生產，本項之國外部分也獲得日本昭和電工亞洲區總經銷商的親睞，協助進入大陸市場。

二、 過程

日本 Nano Tech 2010 於 2 月 17-19 日東京 Big Sight 展場舉行。展出六大類別的奈米科技：

- (1) 材料與原料
- (2) IT 與電子原件
- (3) 生物科技
- (4) 機動車
- (5) 環境與能源
- (6) 醫療、化妝品、食品/農業、及其他

幾乎已涵蓋目前所有之奈米科技產出。各種新穎的研究主題與成果均可在展覽中找到。

展場內區分為下列六個類別：

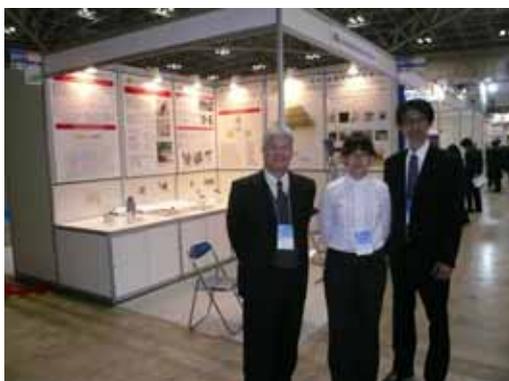
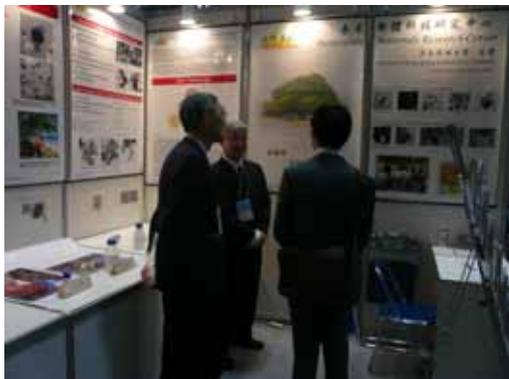
- (1) nano tech Public organizations, University laboratories & Overseas pavilion area
- (2) nano tech commercial firms area
- (3) Nano Bio Expo
- (4) InterAqua
- (5) nano & neo functional material
- (6) ASTEC/METEC

本中心攤位名稱爲“ Particulate Materials Research Center, National Cheng Kung University, Taiwan ”，展出三個主要研究成果：(1) 新一代汽車觸媒轉換器中蜂巢陶管表面覆蓋層(Washcoat)塗料與粉體、(2) 防水數位噴墨印刷相紙的漿料與粉體、及(3)大版面金屬版拋光用球形氧化鋁粉末。攤位被置於環境與能源類中，但展出項目則爲材料與原料及機動車類。

會場中並設有各國的展覽區：包括台灣、比利時、加拿大、芬蘭、德國、義大利、韓國、丹麥、羅西亞（俄國）、新加坡、瑞士、西班牙、英國等的專區。國內清華大學、交通大學、中正大學、中原大學、台灣師範大學、也將研究成果以海報方式加入台灣館參加展出。

本中心獨立攤位提供之三項目中，前兩項(1. 汽車觸媒轉換器中蜂巢陶管表面覆蓋層(Washcoat)塗料與粉體、2 防水數位噴墨印刷相紙的漿料與粉體)已在國內完成技術授權進入商業生產，第三項目前則預定在半年內授權生產。內容均已可商品化，因此除提供展出之海報，內容 DM，相關樣品，及運用成品外，也當場尋找合作及技轉對象。(見附錄)

於展出期間吸引不少有興趣者的詢問與參觀(下圖)。值得一提之事為昭和電工之岡本先生對於球形氧化鋁粉末具有深厚的興趣，認為此粉末具有相當的商業競爭力，正與本中心密切聯繫中。



三、心得及建議

Nano Tech 2010 不愧為世界上最大規模的奈米技術展覽與研討會。因金融風暴使今年參展家數為如預期數字，Nano Tech 2010, Tokyo今年參觀人數僅為四萬兩千多人，較 2009 年的 47272 人少了約 5000 人 參展家數也由 603 下降至 500 多家。但仍為其他國家所難匹敵。來自全球的公司、機構以及國家主題館，展出的攤位達 800 個，研討會 50 場次。透過此展覽會了解全球奈米技術研發現況與發展，並確實藉此展覽擺攤與各國的專家學者進行技術上的交流學習，與參觀收集奈米粉體之相關研究資訊，特別是奈米科技實際運用於太陽能電池CO₂減量技術，水土壤再生（清潔） 技術，收穫良多。

本中心展出三個主要研究成果，也接受 150 人次的造訪及肯定。給本中心的研究團隊莫大的鼓舞。本中心參展以來，迄今四次，均為兩岸大學中唯一以大學研究中心名義參展者。

此次大學研究團隊展出數目較 2009 年增加。計 47 所大學參與。亞洲除地主國日本有 32（其中獨立攤位 28）所大學參與外，台灣有 6 所：除成功大學設獨立攤位外，清華、交通、中正、中原、及台灣師大五所大學設於台灣館內。韓國 1。另外德國、加拿大、及比利時各有 1 所大學參加。而英國 3、瑞士 2，也分別於該國館內展出。

昭和電工之岡本先生對於球形氧化鋁粉末具有深厚的興趣，認為此粉末具有相當的商業競爭力。三月 17 日親自來本校洽談代為商業測試事宜。本中心也密切與其配合，預定於五月中進入技轉階段。

真刀真槍的研究成果，特別是已具有商業運用價值者，更宜參與國際觀摩展會。除展現實力外，也廣交朋友。本校向以追求卓越，成為國際級大學為目標。此次展出三項目也代表本中心對配合學校目標所做的努力。

附件：

1. 參加人員：

顏富士	教授	
游佩青	(博士)	中心專任助理
黃雯巧		中心專任助理
洪辰宗		中心兼任助理
2. 中心展出商品 DM
3. 2010 年展出名錄
4. 展出位置平面圖

附件 2. 中心展出商品 DM

Nano-scaled Flake Gibbsite Powders

FEATURES

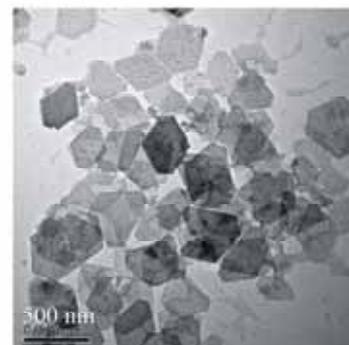
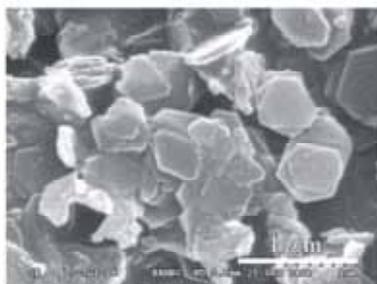
- Euhedral flake outline
- Cross-section 300-600 nm
- Mean thickness 50 nm

Traditionally, gibbsite ($\text{Al}(\text{OH})_3$) is the most important raw material for producing alumina powders in industry. Moreover, it has more advanced applications in composite materials.

Nano-scaled gibbsite flake powders can be synthesized under hydrothermal condition using transition-phase Al_2O_3 powders as the starting materials. It is a simple and low-cost process for producing nano-scaled equal-grained gibbsite flake powders.

APPLICATIONS

- Filler additives in Rubber, Paper, Coatings, Cosmetics
- Carriers of Catalyst
- Flame-resistance additives in Polymer, PCB
- Nanocomposites



Nano Engineered Dispersed Flake nAlumina[®]

Dispersed Flake nAlumina[®] (Slurry) can meet with the application requirements of a variety of industries. These nAlumina[®] are produced in controlled cross-sectional diameter / thickness. Two main categories: functional additives for nano-composites and surface coating materials for digital-printing carriers, of Flake nAlumina are available in commercial quantity (qty in kgs or tons) with appropriate price- to performance ratio.

PRODUCT DATA SHEET

TYPICAL PROPERTIES	FAP 200	FAP 50*	FAS 200	FAS 50*
PHYSICAL				
Primary Crystallite Phase	κ	χ	κ	χ
Particle Size, Mean, nm	200	50	200	50
Range, nm	10~500	--	10~500	--
pH	7.0	7.0	4.5	4.5
Viscosity, cPs			<10	<10
Solid content, wt %	powder	powder	5~40	5~40

* Digital printing paper grade

APPLICATIONS

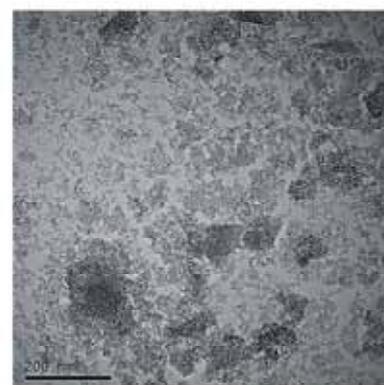
- Functional additives of multi-coating purpose, nano-composites
- Coating for mechanical property enhancement, wear-resistance
- Colorant and pigment carrier, catalysts, digital-printing paper

AVAILABILITY

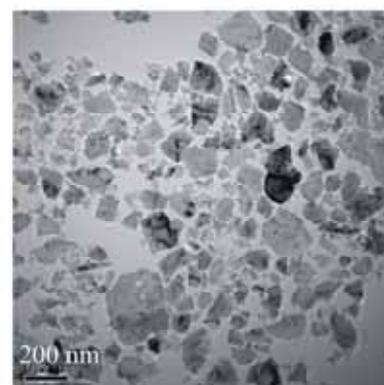
Packing: Fiber Drums

Solvents: Water, Acid, Organic*

*nAlumina dispersible Flake aluminas may be dispersed in organic solvents. Information on dispersions in more sophisticated organic systems is available. Please contact us.



TEM micrographs of FAS 50 slurry.



TEM micrographs of FAS 200 slurry.

Nano Dispersed α -Alumina

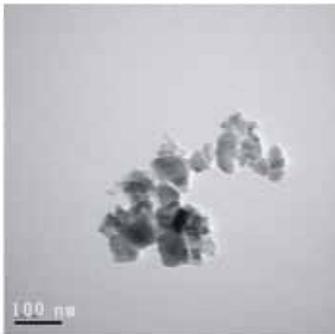
APPLICATIONS

- High strength structural and engineered ceramics
- Precision polishing(CMP)
- Microabrasion
- Translucent alumina ceramic tubes
- Wear-resistance coating applications
- YAG single crystal and sapphire growth applications
- Nanocomposites
- Functional additive polymers

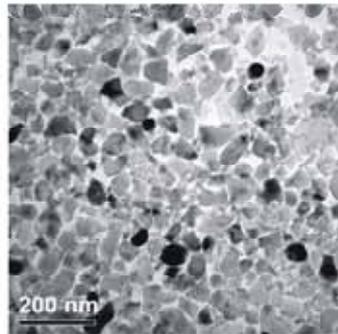
Nano α -Alumina series were engineered nanostructured oxide, with controlled crystallite sizes and purity levels to meet the application requirements of a variety of industries. It has been produced in a variety of standard and customized alumina based products with particle size ranges from 50 nm to 250 nm.

TYPICAL PROPERTIES	NDA-100	NDA-50
PHYSICAL		
Crystalline Phase	α	$\alpha + \theta$
α -Al ₂ O ₃ , wt%	>99	>90
Average Crystallite Size, nm		
α -Al ₂ O ₃	~100	~80
θ -Al ₂ O ₃	—	~20
Particle Size Distribution Range, nm		
	50 ~ 250	20 ~ 150
BET Surface Area, m ² /g	~10	~30

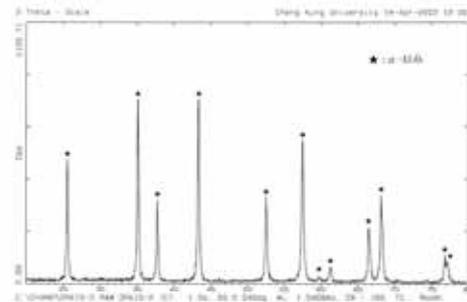
With unique properties, such as high surface-area-to-volume ratios, easy formability and improved performance in end use products, it can be used to replace conventional powders in many applications from polishing medium to the possibility of building some amazing products in a variety of industries.



TEM micrograph of 50 nm α -Al₂O₃



TEM micrograph of 100 nm α -Al₂O₃



XRD pattern of 100 nm α -Al₂O₃

Plate-like α -Alumina powders

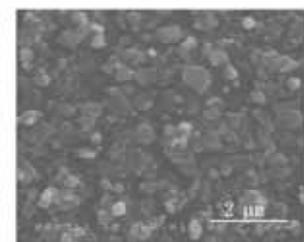
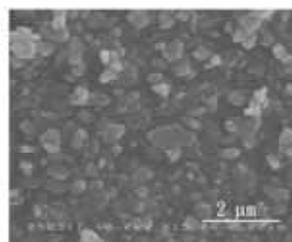
APPLICATIONS

- Reinforcements in various composites
- Improve the facilitation of extrusion
- Improve the thermal conductivity of polymer-ceramic composites
- Transferring objects: ceramic industries and raw materials manufacturers

Alpha alumina with desired characteristics (particle size, distribution and morphology) is required in the development of powder engineering. Plate-like α -Al₂O₃ not only possesses the original advantages of alpha alumina (ex. perfect mechanical properties, high chemical stability and so on) but is often used as reinforcements in various materials to form multiplicate functional composites because of its plate-like shape. Several methods for fabricating α -Al₂O₃ platelets are more complicated and energy-consumption. In this study, plate-like α -Al₂O₃ could be obtained by post-treating the alpha particles with parting planes. It is a simple process and not only could be quantity-producing but has advantages of energy-saving, low-cost as well as low-pollution.

TYPICAL PROPERTIES

PHYSICAL	
Alumina Phase	α
Alumina, wt %	>99
Median Particle Diameter, nm	400



應用於光電領域之特定規格RE:YAG粉末 Defined-size RE:YAG powders for solid state lasers or phosphors

應用

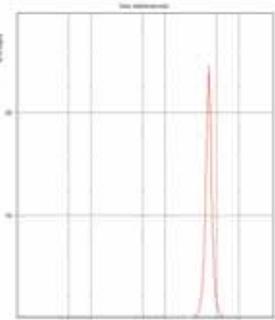
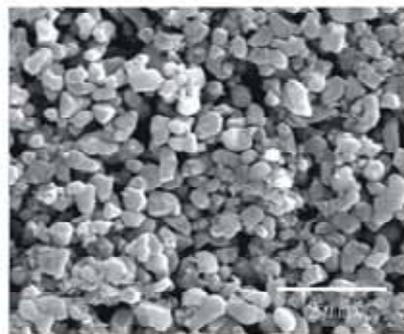
- 高溫低潛變陶瓷體原料
- 螢光粉體基材
- 透明固態雷射基材

規格

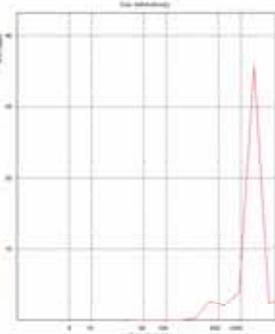
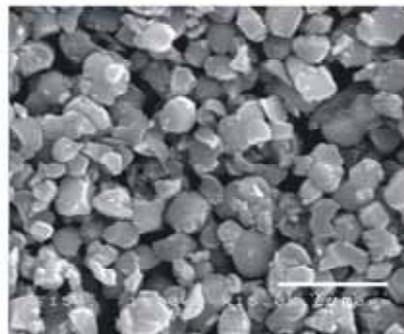
- 稀土元素(RE)添加量
Nd 1 at%, Yb 5 at%
- 粒徑範圍為0.3-0.5與1-2 μm

特徵

- 粉末粒徑可藉由熱處理控制
- 微結構均勻、粒徑均一
- 可燒製透明(Nd, Yb):YAG
固態雷射
- 製程簡單、可量產



0.3-0.5 μm (Nd, Yb):YAG



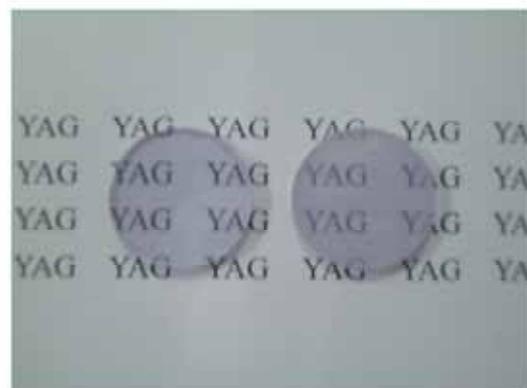
1-2 μm (Nd, Yb):YAG

Applications

- The host material for solid state lasers (in single crystal or ceramics forms)
- Ceramics show a low creep rate at high Temperatures
- The host material for phosphors

Specifications

- Nd 1 at% and Yb 5 at% doped
- Powders with defined-size of 0.3-0.5 and 1-2 μm



Transparent (Nd, Yb):YAG ceramics fabricated by defined-size powders

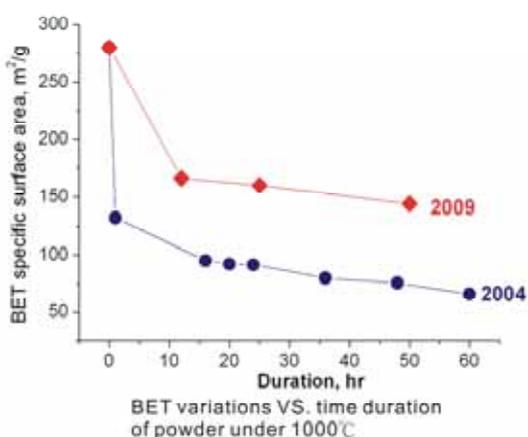
Features

- Defined-size RE:YAG powders controlled by thermal treatment
- Powders with homogeneous microstructure and particle size
- Suitable for the fabrication of transparent (Nd, Yb):YAG ceramics
- Simple and practicable in large scale production

High Temperature High Specific Surface Area Alumina

APPLICATIONS

- Chemical catalysts
- Automobile washcoat catalysts
- Catalyst binders and support
- Sol-gel abrasives
- Polishing compounds

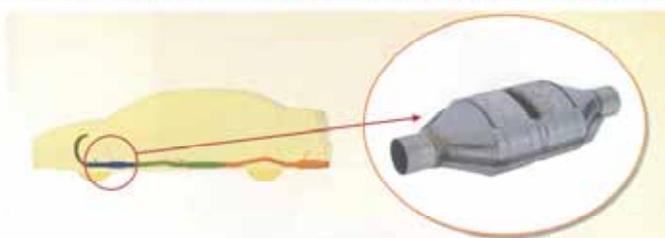


Basic specification of alumina slurry for high temperature catalyst application

TYPICAL PROPERTIES	Powder	Slurry
Primary Crystal Phase	θ , α	θ , α
Total solid contain, wt%	> 99.0	22.2
Al ₂ O ₃ contain, %	> 96	> 22
pH		< 4.0
BET Surface Area, m²/g		
Slurry :		> 205
550°C /3h :	> 80	> 100
1000°C /20h :	> 130	> 130
Viscosity, (cPs)		< 20

High temperature high specific surface area alumina is a special purpose alumina that provides a very stable surface area under extreme temperature. It exhibits the smallest crystallite size and is used for making extruded catalysts, and automobile catalyst converters. It helps to minimize encapsulation of precious metals which potentially offers possibilities for precious metals savings in catalysts applications. They are available as white, free-flowing, spray-dried granule or slurry in customized solvents.

Durability Test for Pollution Control Using HTHS_a Alumina Powders



Vehicle Model: Toyota (Taiwan) Vios

Test Milage, kkm	CO (g/km)	NMHC (g/km)	NOx (g/km)	CO (%)	HC (ppm)	Av. Csmptn of Gasoline, km/L
*B97EG124, 10	0.2	0.022	0.05	0	0	16.8
*B97EG229, 30	0.19	0.024	0.04	0	0	16.4
*B98EG047, 50	0.20	0.026	0.03	0	2	17.0
*B98EG083, 70	0.19	0.032	0.04	0	0	16.9
*B98EG109, 80	0.30	0.027	0.03	0	0	17.6
*B98EG128, 90	0.24	0.034	0.05	0	34	17.6
*B98EG136, 100	0.38	0.033	0.04	0	0	17.2
Taiwan Emission Standard IV	2.11	0.045	0.07	0.5	100	—
EU Emission Standard V	1.00	0.075	0.06	—	—	—

*Measurement procedures were performed by ARTC, Taiwan

High Surface Area Flake Alumina Powders

高表面積片狀氧化鋁粉末

APPLICATIONS

- Fillers for coating, papers, cosmetics
- Carriers for catalysts
- Absorbents for cleaning purposes
- Nanocomposites
- Polishing mediums

應用

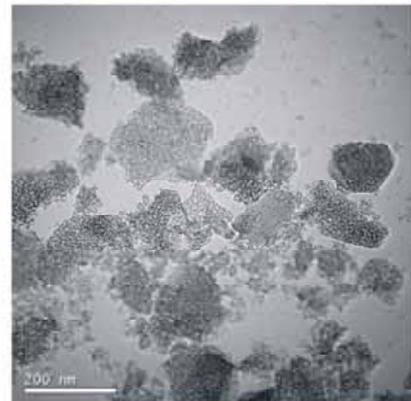
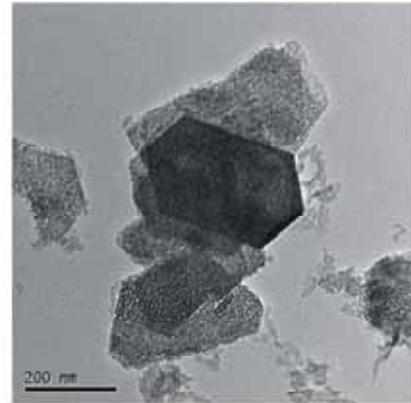
- 塗層、紙張及化妝品的填充料
- 觸媒載體
- 清潔用吸附材料
- 奈米複合材料
- 拋光材介質

SPECIFICATION

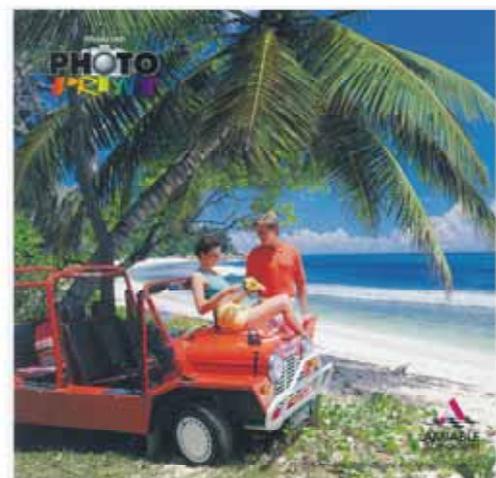
Particle size, nm	$d_{50} \sim 600$ $d_{90} \sim 1000$
Cross-section diameter, nm	100~ 500
Thickness, nm	~ 10
True density, g/cm ³	3.0
Bulk density, g/cm ³	2.0 ~ 2.2
SSA-BET, m ² /g	145~ 190

CHEMICAL COMPOSITION

Al ₂ O ₃ :	99.85%
L. O. I.:	< 0.2%
Fe ₂ O ₃ :	160 ppm
SiO ₂ :	150 ppm
Na ₂ O:	750 ppm



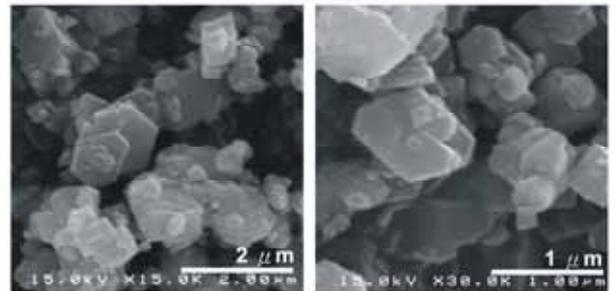
TEM micrographs of the high surface area flake alumina powders.



Laminated coating paper made by PMRC for inject printing.

Mechanical De-lamination Technology

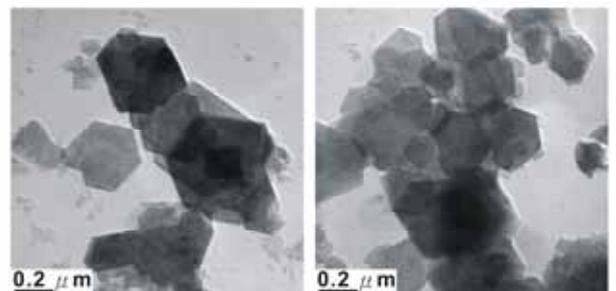
- Mechanical de-lamination technology for plate / flake particles
- Flaked clays, Aluminum hydroxides, Alumina



As-received materials

APPLICATIONS

- Functional additives of multi-coating purposes
- Coating for mechanical property enhancements, Wear-resistance
- Colorant and pigment carrier, Catalysts
- Digital printing papers



After de-lamination

High Rounded α -Al₂O₃ Powders Fabricating Technology

APPLICATIONS

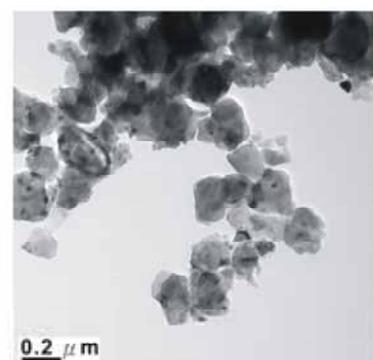
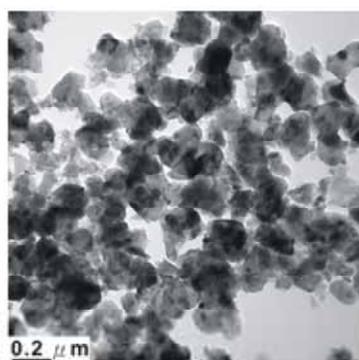
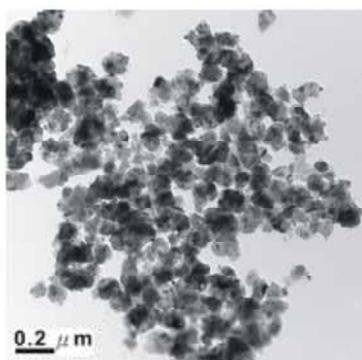
- Chemical Mechanical Polishing (CMP)
- Microabrasion
- Functional Additive Polymers

應用

- 化學機械研磨/平坦化
- 微粒研磨介質
- 功能性添加材料

SPECIFICATION

Typical properties	Powder	Slurry
Primary Crystal Phase	θ, α	θ, α
Total Solid Contain, wt%	> 99%	30
Al ₂ O ₃ Contain, %	> 90	>60
Average Crystallite size, nm		
α -Al ₂ O ₃	~ 150	~ 150
θ -Al ₂ O ₃	~ 200	~ 200
Particle Size Distribution, nm	50-300	50-300
pH	-	~ 10
SSA-BET, m ² /g	>10	> 10



TEM micrographs of the spherical alumina powders.

附件 3. 2010 年展出名錄

A Applied Nanotech, Inc (USA)
 ARKEMA (France)
 B BOHONG Co. Ltd. (Korea)
 E European Patent Office (Germany)
 F FEI Company (Netherlands)
 I Future Carbon GmbH (Germany)
 IMRA America, Inc. (USA)
 Iran Nanotechnology (INBN)
 I3M MICROTECHNOLOGY NETWORK (Germany)
 K KH-CHEMICALS Co., Ltd. (Korea)
 M MikroMasch (Austria)
 N Nano Lincoln Co., Ltd. (Korea)
 Nano Technology Inc. (Korea)
 Nanopy S.A. (Belgium)
 NANONTEGRIS (USA)
 Nanosurf AG (Switzerland)
 NanoWorld AG (Switzerland)
 Netherlands NanoMed
 P **Particulate Materials Research Center, National Cheng Kung University (Taiwan)**
 S SPCCS GmbH (Germany)
 W WORLD GOLD COUNCIL (UK)

Belgium Pavilion

Belgium Wallonia Foreign Trade and Investment Agency
 e-Xstream engineering s.a.
 idip s.a.
 NanoWal
 Open Engineering S.A.

FLANDERS INVESTMENT&TRADE

IMEC
 Louvain Nanocenter
 Umicore
 VITO

Canada Pavilion

Embassy of Canada
 Government of Alberta
 NanoQuebec

Finland Pavilion

TEMA Functional Materials Programme
 Carbonex Ltd
 Nanocomp Ltd
 OSKE Nanotechnology Cluster Programme
 Picoseed Ltd
 VTT

German Pavilion

Germany, Federal Ministry of Economics and Technology
 Ainfotec Instruments AG
 Science Laboratories, Inc
 Bayer MaterialScience AG
 BMGF / VDI Technologiezentrum GmbH
 BYK-Chemie GmbH
 DTF Technology GmbH - Dresden Thin Film Technology -
 Fraunhofer ENAS
 Fraunhofer-Gesellschaft
 Fraunhofer Institute for Applied Optics and Precision Engineering IOF
 Fraunhofer Institute for Ceramic Technologies and Systems ICTS
 Fraunhofer Institute for Electron Beam and Plasma Technology
 Fraunhofer Institute for Manufacturing Engineering and Automation IPA
 Fraunhofer Institute for Silicate Research
 GAO Coatings GmbH
 IBU-abc advanced materials AG
 IOLTEC Ionic Liquids Technologies GmbH

J. Rettermaier & Sothe GmbH + Co. KG

micro resist technology GmbH
 Nanoinitiative Bayern GmbH
 Darmstadt Institute of Plastics Engineering
 IMN MacroNanor, Ilmenau University of Technology
 Innovap GmbH
 Sanyo Trading Co., Ltd.
 Nanosystems Initiative Munich
 Nanotechnology Center of Competence c/o Fraunhofer IWS
 AXO DRESDEN GmbH
 FHR Anlagentechnik GmbH
 Forschungszentrum Dresden Ressourcenzentrum, Institute of Radiochemistry
 Fraunhofer Institute for Non-Destructive Testing
 NETZSCH-CONDUX Messtechnik GmbH
 NETZSCH-Fremdtechnik GmbH
 S&S Clefins & Surfactants GmbH
 Saxony Economic Development Corporation
 City of Dresden Economic Development Office
 Saxony Electronics Saxony
 Organic State Ministry for Economic Affairs, Labor and Traffic
 Technische Universität Dresden Institut für angewandte Photochemie
 Technische Universität Dresden Institut für angewandte Physik
 temicon GmbH
 Holotopia GmbH

Italian Trade Commission

INVITALIA SPA
 NANO MATES (Research Centre for NANOMaterials and NanoTechnology at Salerno University)
 REMDITE AGENCY FOR INVESTMENTS, EXPORT AND TOURISM-INWARD INVESTMENT UNIT
 SORDIA NANOTECHNOLOGIE SRL
 SULLI SISTEMI INTEGRATI
 VIALTO NANOTECH
 XLNA

KOREA Pavilion

NTRA (Nanotechnology Research Association of Korea)
 ANSUNG Industrial company Co., Ltd.
 Applied Carbon Nano Technology Co., Ltd
 BIONER
 CEKO Co., Ltd.
 Cluster Instruments Co., Ltd.
 Daejin Industrial Co., Ltd.
 EM-POWER CO., LTD
 Hanil one mineral company
 Nano Ensolin
 NANOMIRAE Co., Ltd.
 NanoNC
 NanoSolution CO., LTD.
 SR DAEDONG I TECH CO., LTD.
 Sukkyang AT Co., Ltd
 WinTube, an Ltd

NILCOM (Denmark)

Applied Micro Structures (Applied MST)
 EV Group
 micro resist technology GmbH
 N.L. Technology ApS
 PVA TePla AG

RUSNANO (Russian Corporation of Nanotechnologies)

CEC, Galileo Nanotech
 Composite Holding Company
 KONIT, Group of Companies
 Microbot Technology, Ltd.
 New Caustichou, Ltd. Co
 Nitel Solar, Ltd.

SLW Innovation Company
 TRACKPORE TECHNOLOGY Corporation
 Vintil, Ltd.

Singapore Pavilion

International Enterprise Singapore

Spain Pavilion

Phantoms Foundation
 AlonASIP
 AVANZARE Innovation Tecnológica S.L.
 Institute for Bioengineering of Catalonia (IBEC)
 Institute of Nanoscience of Aragon (INA)
 International Iberian Nanotechnology Laboratory (NIL)
 L'urederra Technological Centre / Tecnara
 Nanobiomatiers
 NANOGRAF SUB-AM-POWDER S.A.
 NANOMIMUNOTECH S.L.
 Nanopy
 Nexcor S.L.
 RAMEM-Iker
 Spanish National Research Council (CSIC)

Swiss Pavilion

Inno-X
 CSEM
 Empa, Material Science & Technology
 Euiltha
 Lynode Tec
 Micronarc
 Nanograde
 Phasix

Taiwan Pavilion

A.T.P. Co., Ltd.
 Center for Nano Bio-Detection, National Chung Cheng University
 Department of Biomedical Engineering, Chung Yuan Christian University
 Department of Chemistry, National Taiwan Normal University
 Department of Electronics Engineering, National Chiao Tung University
 Department of Materials Science and Engineering, National Tsing Hua University
 Industrial Technology Research Institute
 Institute of Atomic and Molecular Sciences, Academia Sinica
 Institute of Nuclear Energy Research, Atomic Energy Council, Executive Yuan
 Institute of Physics, Academia Sinica
 Instrument Technology Research Center, National Applied Research Laboratories
 N-Kung Industrial Co., Ltd.
 Nanotechnology Education Resource Development Center for Central Taiwan
 Nanovie Co., Ltd.
 REGA Biotechnology Inc.
 Taiwan Textile Research Institute

UK Pavilion

Institute of Occupational Medicine
 ION Publishing Ltd (A NANO magazine)
 Nanoco Technologies Limited
 Nanoposts
 Promethean Particles Limited
 Sheffield Hallam University-Nanofactory
 University of Bradford-Nanofactory
 University of Huddersfield Nanofactory
 University of Leeds-Nanofactory
 University of Sheffield (METRC)
 University of Sheffield-Nanofactory
 York University-Nanofactory

nano week 2010

for detailed program and registration : <http://www.nanotechexpo.jp/en/nanoweek2010.html>

● Green Nanotechnology Special Symposium 2010

*Simultaneous interpretation(English and Japanese)
 February 17-19, 2010 11:00-16:00
 Place : Main Theater in the Exhibition Hall
 Organized by nano_tech executive committee

● 6th Nano Bio International Symposium *Japanese language only

February 17, 2010 9:00-17:15
 Place: Room 805, 6F, Conference Tower
 Organized by Nano Bio Expo Executive Committee
 Participants : 120 people
 Admission Fee : One session : 10,000 yen/person Two sessions : 15,000yen/person

● 5th Advanced Surface Technology Conference *Japanese language only

February 18, 2010 10:00-17:05
 Place: Room 805, 6F, Conference Tower
 Organized by ASTEC Executive Committee
 Participants : 120 people
 Admission Fee : One session : 10,000 yen/person Two sessions : 15,000yen/person

● METEC'10 Technical Seminar *Japanese language only

February 19, 2010 13:15-16:15
 Place: Seminar Room in the Exhibition Hall
 Organized by METEC Executive Committee
 Participants : 100 people
 Admission Fee : 3,000yen/person

● nano & neo Functional Material 2010 Technical Forum *Japanese language only

February 18, 2010 10:00-17:00 (Coating)
 February 19, 2010 10:00-17:00 (Cohesive element technology)
 Place: Room 709, 7F, Conference Tower
 Organized by Converting Technical Institute
 Participants : 60 people each
 Admission Fee : 30,000yen/person/day

● 9th NIMS Forum -Focusing on leading-edge research and technology transfer-

*Simultaneous interpretation(English and Japanese)
 February 17, 2010 10:00-18:00
 Place: International Conference Room, 7F, Conference Tower
 Organized by National Institute for Materials Science (NIMS)
 Participants : 800 people (Free admission)

● NEDO Water Solution Symposium

*Simultaneous interpretation(English and Japanese)
 February 17, 2010 10:30-18:30
 "Global Water Business Trends and Japan"
 Place : Reception Hall A, 1F, Conference Tower
 Participants : 400 people (Free admission)

February 18, 2010 9:00-18:00
 "Global Water Solutions and Business"
 Place : International Conference Room, 7F, Conference Tower
 Participants : 1000 people (Free admission)
 Organized by New Energy and Industrial Technology Development Organization (NEDO)

● Symposium: Nanotechnology Human Resource Development and Nanotechnology Research and Development Center in the World

-Expectations for Tsukuba Innovation Arena for Nanotechnology [TIA Nano] in Japan-
 *Japanese language only

February 17, 2010 15:00-17:30
 Place : Room 703, 7F, Conference Tower
 Participants : 120 people (Free admission)
 Organized by Council Board for the Tsukuba Innovation Arena for Nanotechnology
 University of Tsukuba, National Institute for Materials Science (NIMS)
 National Institute of Advanced Industrial Science and Technology (AIST)
 Nippon Keidanren (Japan Business Federation)

● WORKSHOP ON INTERNATIONAL NANOTECHNOLOGY STANDARDIZATION

*Japanese language only
 February 17, 2010 13:00-17:00
 Place : Room 102, 1F, Conference Tower
 Organized by National Institute of Advanced Industrial Science and Technology(AIST)
 Japanese National Nanotechnology Standardization Committee
 Participants : 100 people (Free admission)

● RIKEN Asian Research Network Symposium *English only

February 17, 2010
 Place : Room 610, 6F, Conference Tower
 Organized by RIKEN
 Participants : 100 people (Free admission)

● 8th Polymer Nanotechnology Symposium *Japanese language only

February 18, 2010 9:30-16:45
 Place : Room 102, 1F, Conference Tower
 Organized by Research Group on Polymer Nanotechnologies, The Society of Polymer Science, Japan
 Participants : 100 people

● 8th Symposium on Nanotechnology (JAPAN NANO 2010)

*Simultaneous interpretation(English and Japanese)
 February 19, 2010 10:00-17:30
 Place : Reception Hall AB, 1F, Conference Tower
 Organized by National Institute for Materials Science (NIMS)
 Participants : 1,000 people (Free admission)

● Comprehensive Approach to Public Engagement of Nanotechnology *Japanese language only

February 19, 2010 13:00-17:00
 Place : Room 101, 1F, Conference Tower
 Organized by National Institute of Advanced Industrial Science and Technology (AIST)
 Participants : 100 people (Free admission)

● nano ICT Symposium *Japanese language only

February 19, 2010 10:00-17:00
 Place : Room 102, 1F, Conference Tower
 Organized by National Institute of Information and Communications Technology
 Participants : 100 people (Free admission)

附件 4. 展出位置平面圖

案内図

2010 2.17 Wed.~19 Fri. 10:00~17:00
東京ビッグサイト 東4・5・6ホール&会議棟

展示会共通テーマ

Green
NANOTECHNOLOGY

10⁻⁹がつくる環境力
Sustainability with every nanometer

バイオ Expo 2010
Expo 2010

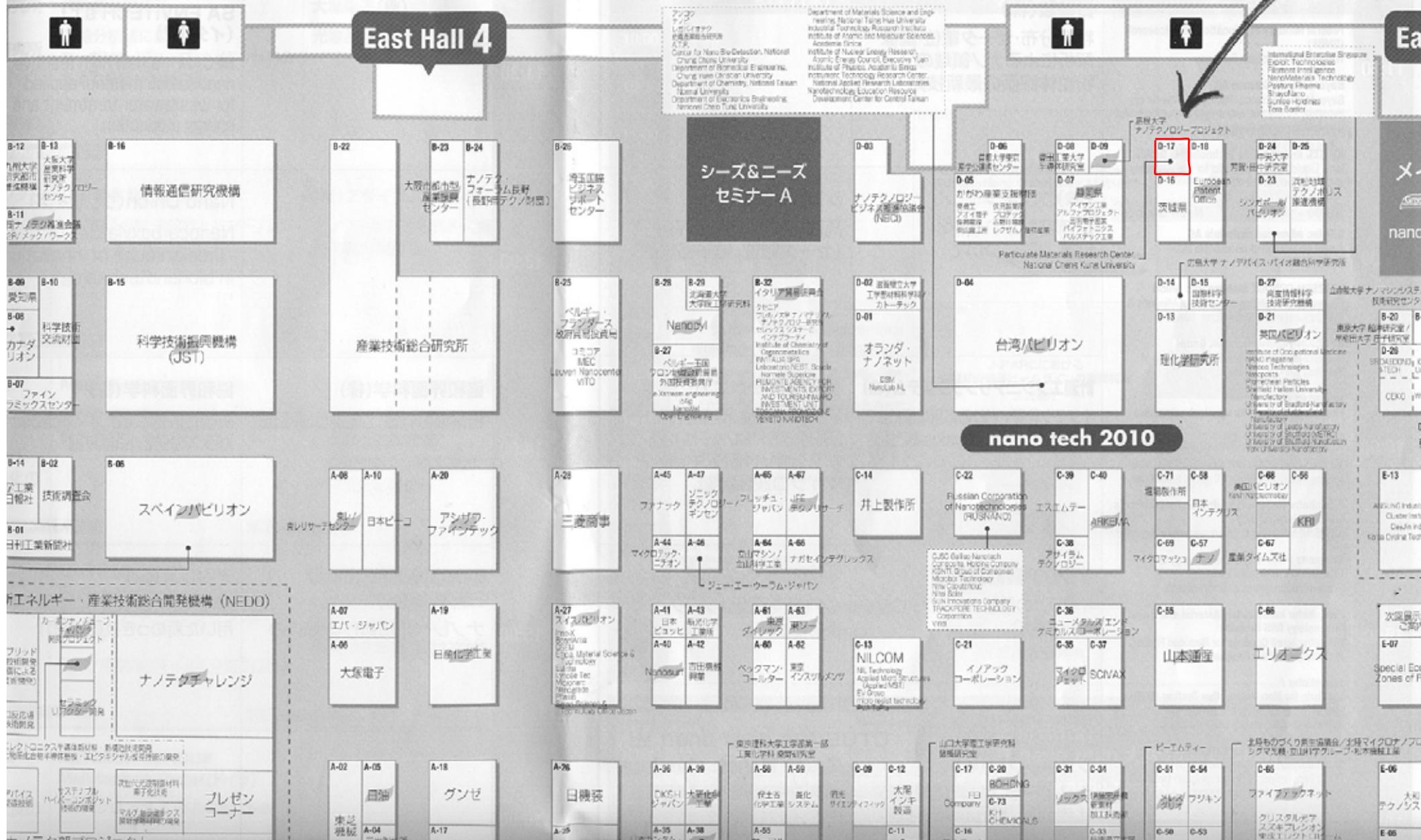
nano neo 新機能性材料展 2010

ASTEC 2010
国際先端表面技術展・会議

METEC'10
第39回 表面処理材料展合展

InterAqua O 2010
国際水ソリューション総合展

East Hall 4



科学技術振興機構(JST)	B-15
化学工業日報社	B-14
かがわ産業支援財団	D-05
菱機工	
アオイ電子	
伸興電線	
東山織工所	
伏見製薬所	
プロテック	
吉野川電線	
レクザム / 隆祥産業	
カーテック	D-02
カナダパビリオン	B-08
Embassy of Canada	
Government of Alberta	
Nano Ontario	
NanoQuebec	
University of Waterloo	
韓国パビリオン	D-26 D-28 E-13 E-21
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Korea Aerospace University (Micro & Nano Heat Transfer Lab)	D-28
Korea Dyeing Technology Center	E-13
NANOMIRAE	E-21
NanoNC	E-21
NanoSolution	D-28
SR DAEDONG I-TECH	D-26
Sukgyung AT	E-21
Worldtube	D-26
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京都市	F-09
京都大学 エネルギー理工学研究所	E-54
熊本TLO (くまもとテクノ産業財団) / 熊本大学	F-22
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国際科学技術センター (ロシア)	D-15
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埼玉国際ビジネスサポートセンター	B-26
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滋賀県立大学 工学部 材料科学科	E-51

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アルファプロジェクト	
三井電子産業	
パイフォニクス	
パルステック工業	
シスメックス	A-21
芝浦工業大学 先端工学研究機構	
フレキシブル微細加工研究センター	F-21
高津製作所	E-22
島根大学 ナノテクノロジープロジェクト	D-09
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スペインパビリオン	B-06
Phantoms Foundation	
AlphaSIP	
AVANZARE Innovación Tecnológica S.L.	
Institute for Bioengineering of Catalonia (IBEC)	
Institute of Nanoscience of Aragon (INA)	
International Iberian Nanotechnology Laboratory (INL)	
Llurederra Technological Centre / Tecnan®	
NanoBioMatters	
NANOGAP SUB-NM-POWDER	
NANOIMMUNOTECH S.L.	
Nanorioja	
Neoker S.L.	
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ナノビ	
レガバイオテック	
紡織産業総合研究所	
A.T.P.	
Center for Nano Bio-Detection, National Chung Cheng University	
Department of Biomedical Engineering, Chung Yuan Christian University	
Department of Chemistry, National Taiwan Normal University	

Chaio Tung University	
Department of Materials Science and Engineering, National Tsing Hua University	
Industrial Technology Research Institute	
Institute of Atomic and Molecular Sciences, Academia Sinica	
Institute of Nuclear Energy Research, Atomic Energy Council, Executive Yuan	
Institute of Physics, Academia Sinica	
Instrument Technology Research Center, National Applied Research Laboratories	
Nanotechnology Education Resource Development Center for Central Taiwan	
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Fraunhofer Institute for Applied Optics and Precision Engineering IOF	
Fraunhofer Institute for Ceramic Technologies and Systems ICTS	
Fraunhofer Institute for Electron Beam and Plasma Technology	
Fraunhofer Institute for Manufacturing Engineering and Automation IPA	
Fraunhofer Institute for Silicate Research	
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FHR Anlagenbau	
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Fraunhofer Institute for Non-Destructive Testing	
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NIL Technology (デンマーク)	
Applied Micro Structures (Applied MST) (米国)	
EV Group (オーストリア)	
micro resist technology (ドイツ)	
PVA TePla (ドイツ)	
農業生物資源研究所	F-02
豊林水産食品ナノテクノロジープロジェクト	F-02
Particulate Materials Research Center, National Cheng Kung University (台湾)	
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Carbideon	
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Jyväskylän Innovation	
Blancocom	