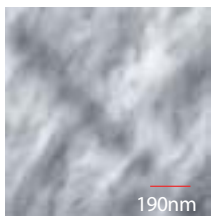
Nanoclay Composite Materials
奈米粘土複合材料

Clay is a natural nanomaterial. Through intercalation and exfoliation it can from composites with various polymers with desirable properties. ITRI is among the first in the world in producing clay composites for PET bottles with high transparency and much reduced gas permeability. Other applications include nylon fabrics with enhanced IR absorption for better preservation of body warmth, high heat resistant plastics for engine covers, high strength plastics for automobile bumpers, flame-retardant ABS, etc.

粘土是一種天然的奈米材料，經過插層反應或分頁作用的處理，可以與各類高分子材料形成特殊性質的複合材料。工研院在這方面是世界上少數做出全透明，高阻氣奈米粘土複材寶特瓶材質的研究單位之一。另外，奈米粘土尼龍纖維具選擇性吸收遠紅外線輻射機能，可增進保暖且具有促進人體皮膚血液循環的功能。其他應用包括可做汽車引擎蓋的耐高温塑料、高強度的汽車保險桿和難燃性的ABS塑膠等。



Nanocomposite chip

- Fully Exfoliated
- Nano-clay＜1 wt%
- Far-ir Emissivity＞0.9
- 300 tons/vear Pilot Plant (CPC)

Nanocomposite fiber

- High spinning rate: 4000 m/min

Nanocomposite cloth

- Temperature increase 2-3˚C

Properties of Nylon/Clay textile and commercial Far-IR textile

Textile	Temperature increase on surface	Other properties			State of dispersion	Far-IR particle content
		Hand feeling	Spin ability	Processing property		
Nylon/clay Textile	2.3˚C	good	good	good	In nano scale	0.5 wt%
Commercial Far-IR Textile	1.8˚C	fair	bad	bad	In micro scale	0.4 wt%

O_2 barrier, 40% improvement (0.66 wt% clay)
2003/03

Gas barrier PET/clay bottle

Decrease the amount of flame retardant by 1/3 (3 wt% clay)
2000/12

Flame retardancy of ABS/clay

Applications

- Engeneer plastic
- Food packaging materials
- Functional additives of fiber
- PCB and electronic packaging materials
- Coating materials