

Nanomaterials of High-performance Polymers

– Creation of Super Materials by Novel Methodology for Morphology Control -

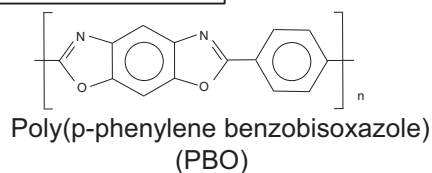
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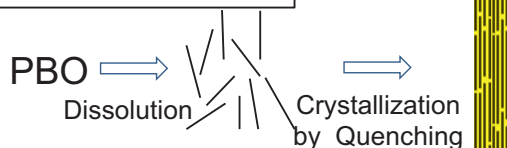
We developed new simple preparation methods for morphology control of aromatic polymers to afford high-performance nanomaterials.

☆ Preparation of Rigid Polymer Nanofiber by Using Crystallization from Dilute Solution

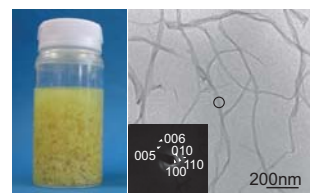
Rigid Polymer



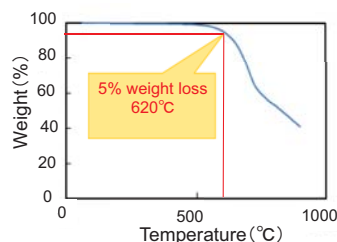
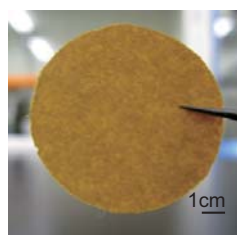
Preparation Methods



PBO Nanofiber Φ 50nm



PBO Nanofiber Mat

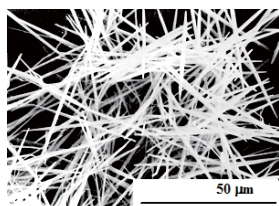


Porosity 28%, High Thermal Stability (10% Weight Loss: 650°C),
High Thermal Diffusivity (in-plane: 11.5 W/m \cdot K),
Low Linear Thermal Expansion Coefficient ($-14.2 \times 10^{-6} \text{ K}^{-1}$)

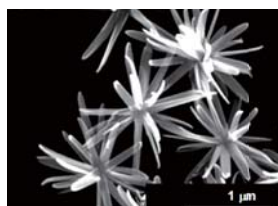
☆ Morphology Formation by using Reaction-induced Phase Separation

▪ Reaction-induced Crystallization

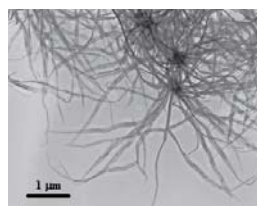
(Aromatic Polyester Whiskers, Nanofibers and Nonwoven Fabrics, Aromatic Polyimide Nanoribbons, Aromatic Poly(ester-imide) Helical Nanoribbons, Aromatic Polybenzimidazole Nanofibers, etc)



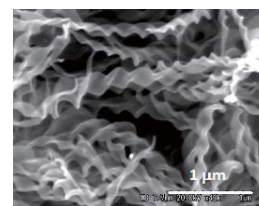
Aromatic Polyester Whiskers



Aromatic Polyimide Nanoribbons



Aromatic Polyimide Nanoribbons



Aromatic Poly(ester-imide) Helical Nanoribbons

▪ Reaction-induced Liquid-Liquid Phase Separation

(Aromatic Polyester Microspheres, Aromatic Polyimide Microspheres, Aramide Hollow Spheres, etc)



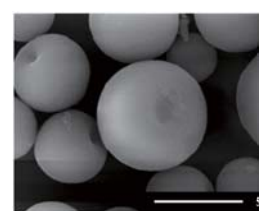
Aromatic Polyester Microspheres



Aromatic Polyester Microspheres having Unique Surface



Aromatic Polyimide Microspheres



Aramid Hollow Spheres

