Unique Block Copolymers

New block copolymers containing catechol segments capable of supporting inorganic nanoparticles

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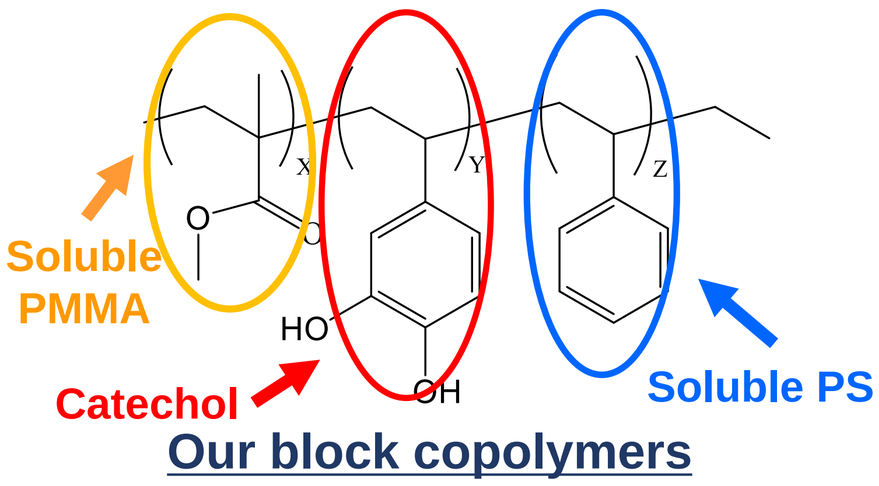
1. Abstract

We invented new unique block copolymers containing Catechol segments.



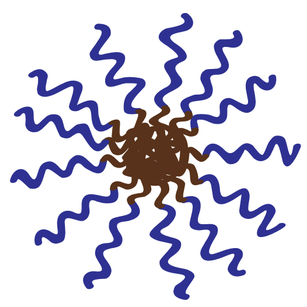
Our block copolymers

1. This block copolymer is adhesive to solid substrates.
2. This polymer is capable of forming inorganic nanoparticles from metal ions.
3. No reducing agent is required to form the particles.
4. This polymer containing inorganic nanoparticles has further electrical conductivity.

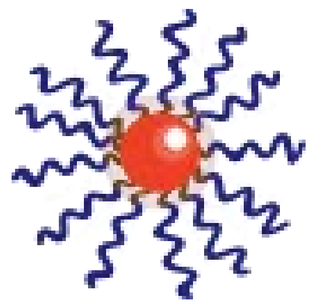
2. Key Features

Our block copolymers

(i) cast solution onto a substrate
(ii) evaporate solvent



Inorganic material (eg. metal salt) solution



This block copolymer has adhesion to the substrate.

Each segment aggregates to microphase separated phase.

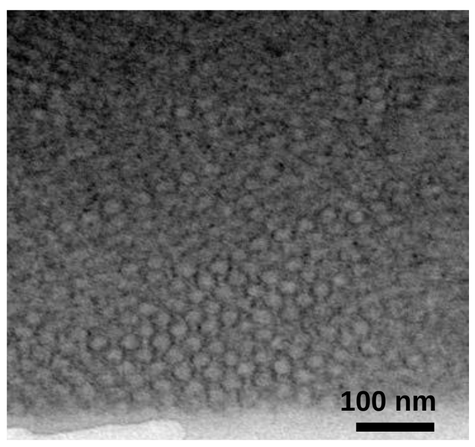
The Catechol segments reduce metal ions without any reducing agent.

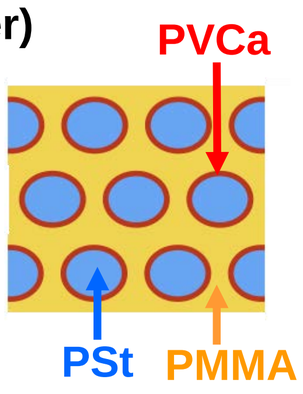
Inorganic nanoparticles are supported with block copolymers

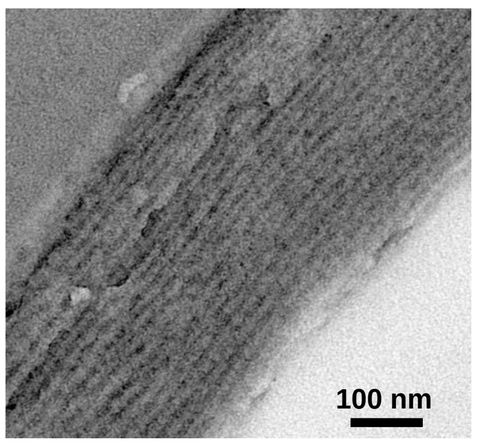
3. Experimental Data

Eg. Triblock polymer (PMMA / PSt / PVCa)

◆TEM (Block copolymer)



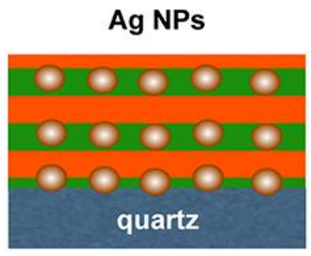




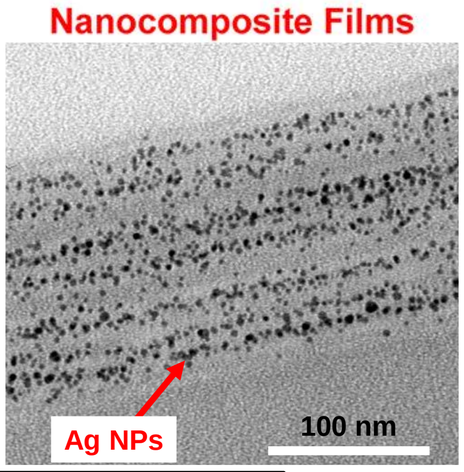
Core-Shell Cylinder (CSC) Microphase Separation

Layered structure is formed.

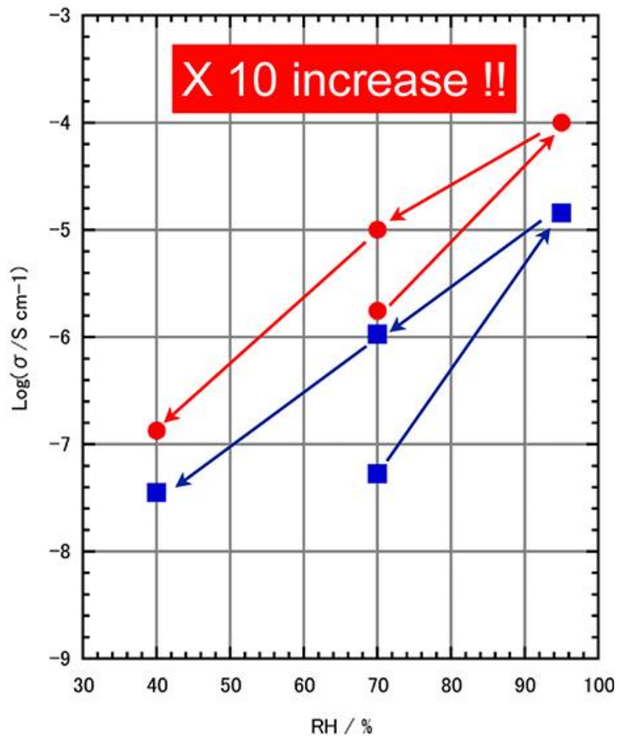
◆Block Copolymer + Nano particle (Ag)



Nanocomposite Films



[Proton conductivity]



■ Block Copolymer
● Block Copolymer + Ag Nano particles

Nanocomposite film with anisotropic proton conductivity is realized by nanoparticle precipitation in the layered structure.

4. Application Examples

◆Adhesive material
◆Electrical conductivity material (with Metal nano particle) : Electrode, Electrolytes for Fuel Cell etc
◆Magnetic material (with Magnetic particle)

5. Patent Licensing Available

Patent No.: WO2015/129846 (JP, US, EP)

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