

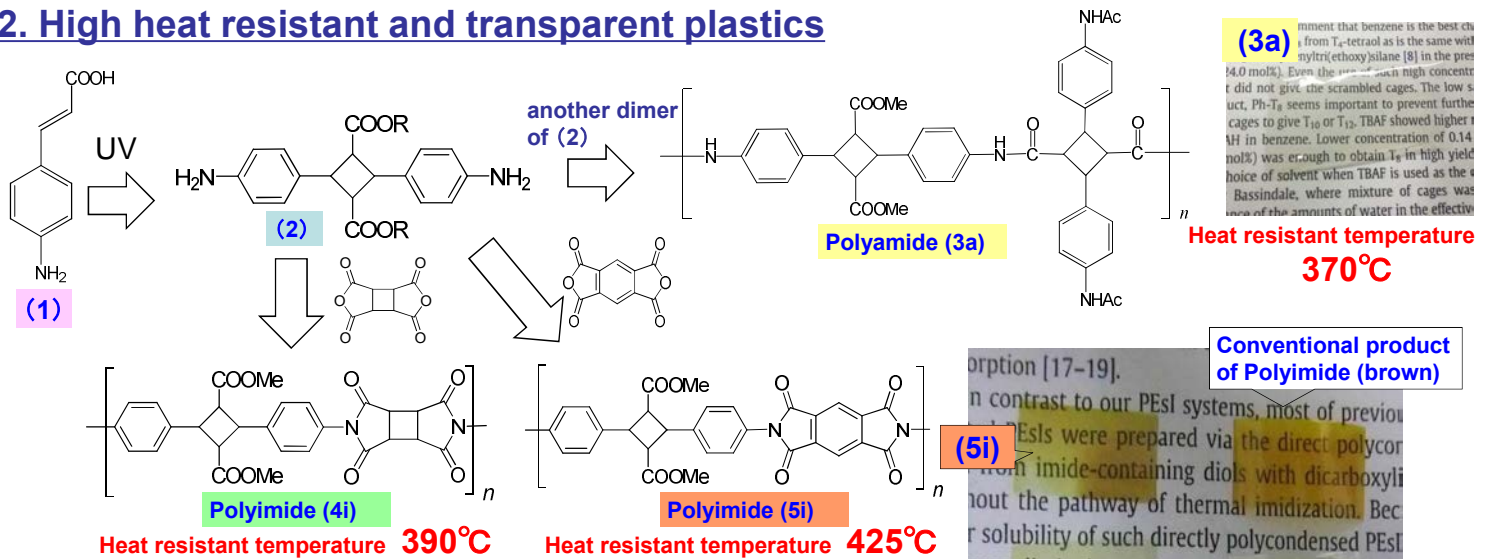
1. Technical Summary

■ A combination of microbial production and photochemical reaction created monomer (2).

- ① We have established a microbial production conditions of 4-aminocinnamic acid (1), which was generally considered difficult due to incompatibility of aniline compound with microorganisms.
- ② By photochemical reaction of 4-aminocinnamic acid (1), the monomer (2) was synthesized in almost 100 % yield.

■ Polyamides and polyimide films have been synthesized from monomer (2). These films have a very high heat resistance and excellent transparency.

2. High heat resistant and transparent plastics



Biocompatibility
No interruption to cell proliferation



3. Comparison with the conventional techniques

Conventional Techniques	Temperature
The melting point of lead-free solder	183°C~378°C
The heat-resistant temperature of Kapton® (DuPont)	>500°C
The heat-resistant temperature of fluorinated transparent polyamides	About 335°C

4. Potential applications

The highest heat-resistant in transparent resin	
Thermal decomposition temperature	Maximum 425°C
Linear thermal expansion coefficient (The values are comparable with metals.)	<10 ppm / K
Transmittance (High transparency)	88% @ 450 nm
Young's modulus (Strength of the material)	10 GPa
High refractive index	1.6
Other Features: Ultraviolet degradation, self-extinguishing, high dielectric breakdown resistance	

- LED sealant
- Flexible Display Devices & Components
- Tempered glass-alternative materials
- Automobile, body material of the aircraft

Patent Licensing Available

Patent : WO2013/073519
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