

The Polyimide technology and application of KANEKA.

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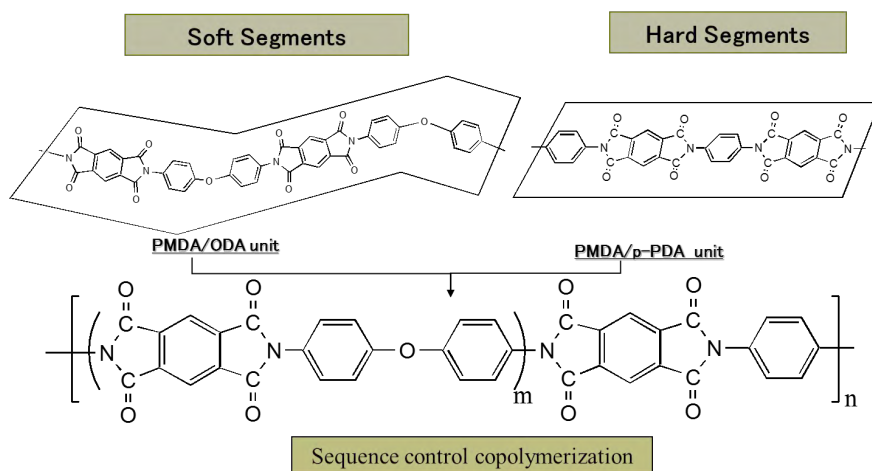
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Abstract:

KANEKA has produced polyimide film “APICAL®” since 1984. We started it very small scale (150tons/year) at Shiga plant in Japan at first. Afterwards polyimide film was used widely in flexible printed circuit boards (“FPC boards”), and this move was designed to meet the further increase in demand expected from the variable mobile machines. Now we have 3,200tons production capacity totally in Japan, the United State and Malaysia.

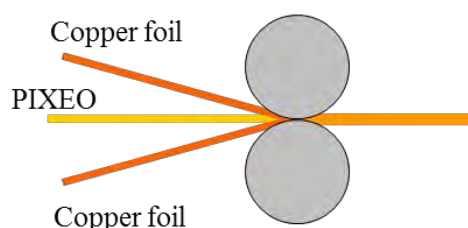
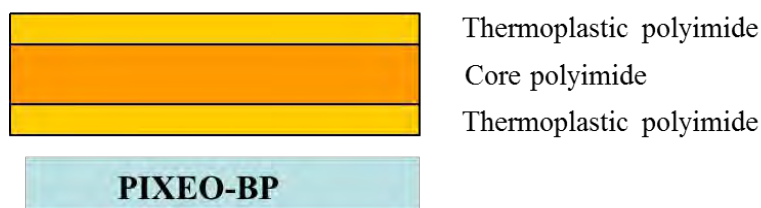
Keywords: FPC board; high dimensional stability; Sequence control copolymerization; thermoplastic polyimide; 2-layer FPC board; orientation of molecule chain ; Graphite Sheet

KANEKA has focused on the FPC board field in polyimide market, and has developed many type of polyimide film products in that fields. When we joined into this market, Kapton was only one polyimide film in the world. This PMDA-4,4'-DADPE polyimide have highly balanced good properties. But we thought that balance was not best for the FPC board application. So we developed new polyimide film APICAL NPI as a high dimensional stability grade product. APICAL NPI have lower CTE and higher Modulus that contribute the trend towards fine pitch wiring of FPC. We have succeeded to develop such polyimide film that have rod like structure and keep enough flexibility by control the sequence of monomer. That sequence control technology is one of most important technology of our polyimide film.



After that, we developed new polyimide product “PIXEO®”. PIXEO is a film that has adhesive

layers of thermoplastic polyimide on either side of the core polyimide film and used in 2-layer FPC boards. Compared to conventional 3-layer FPC boards using epoxy type adhesive, these boards are more reliable and have greater dimensional stability.



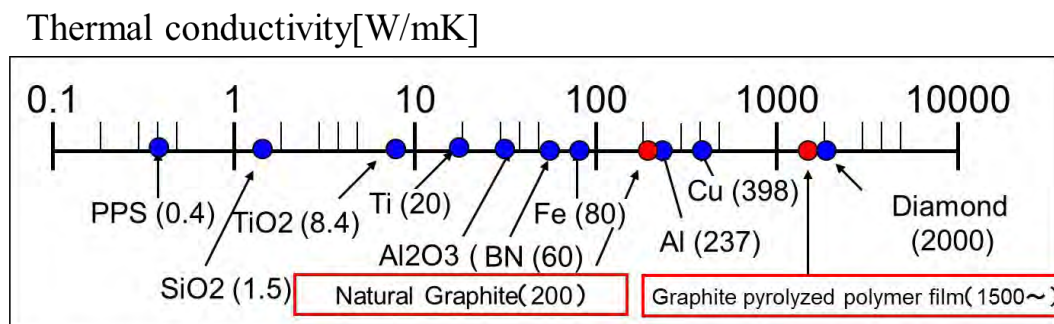
Simple manufacturing process of FCCL by lamination

We can design the molecular structure and thickness each of core polyimide film and thermoplastic polyimide layer.

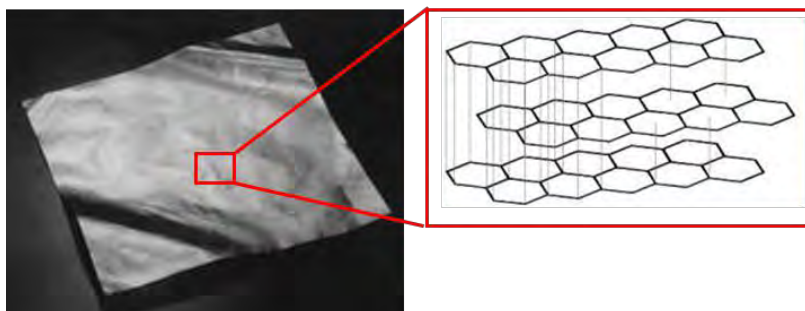
Thereby that new technology have become the base for various unique application like insulation film of superconductive collider's coil of Cern, and sail of the space sailing ship "IKAROS" (IKAROS = Interplanetary Kite-craft Accelerated by Radiation Of the Sun).

And quite new type of technical progress of polyimide is Graphite Sheet as heat spread material. Polyimide film is suitable for the material of Graphite Sheet by high in-plane orientation of molecule chain.

High thermal conductive graphite sheet(GRAPHINITY®) can spread heat in planar direction, and can suppress a heat spot.



Now we developed various material for thermal countermeasure, I'll introduce some of the material and application.



Polyimide film

Graphite Sheet

