Development of Incombustible Clay Film

Daisuke Mishou
Manager Technical Office
SUMITOMO SEIKA CHEMICALS Co.,Ltd.

1. Outline

TOUGHCLAIST®, press released by AIST on August of 2011, is an innovative composite film, It has been developed under the joint research program between SUMITOMO SEIKA CHEMICALS and Dr. Takeo Ebina (A leader of the Advanced Functional Materials Team, the Research Center for Compact Chemical System, AIST), with technical guidance from Dr. Takashi Yamashita (an associate professor at Tokyo University of Science, Development of Science and Technology), we found that the dispersion liquid could be homogeneous by using polyimide and non-swelling clay which specially pretreated and by improving the mixing method, etc., and the film obtained by the method becomes a strong film in which weakness has been improved. It has the merit of characteristics in clay and the excellent handling nature of polyimide too.

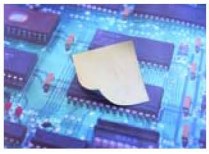
This developed film has the heat resistance of 450℃, and very small shrinkage of 0.04% after heating from room temperature to 350℃.

And it has highest level of flame retardancy among plastic materials, the same electrical insulation properties as polyimide, and water vapor barrier properties superior to polyimide, and the low coefficient of linear expansion of about 10 ppm/K, and thermal conductivity superior to other plastics.

Moreover, We succeeded in making higher water vapor barrier film by making a clay crystal arrange in parallel to the film surface.

2. Application

Printable Electronics : In the process of drying and baking of printed circuit board, heat resistance, low thermal expansion and dimensional stability are required. Also, refinement of circuits requires low dielectric constant of base materials. Having these required properties. “Toughclaist” is expected to be applied for printable electronics materials



Thermal Spread Sheets : “Toughclaist” is expected to be applied for heat-release materials, by adding the filler in order to increase its thermal conductivity or heat radiation, or by laminating with other thermal conductive material. And also it can help secure the safety of various kinds of electronic equipment due to its fireproof properties.

Heat Resistant seal Materials : “Toughclaist” is expected to be applied for a wide range of heat resistant seal materials due to its high heat resistance (like CLAIST®) and its capability of forming thicker films.

Back-sheet for Solar Cells : “Toughclaist” has the properties required for solar cells, such as weather resistance, electrical strength, water vapor barrier, and heat-resistance.