

特別講演会のお知らせ

日時：2019年 8月 6日(火) 16:20~17:50

場所：九州工業大学、院2講義室

講演者： Miguel Angel Martinez Casanova

准教授 (Carlos III University of Madrid(Spain))

講演題目：Study cured kinetic of epoxy resin
by differential scanning calorimetry and
infrared spectroscopy

(示差走査熱量測定と赤外分光法によるエポキシ樹脂の
硬化速度論の研究)

Study cured kinetic of epoxy resin by differential scanning
calorimetry and infrared spectroscopy

The epoxy resins are products obtained from petroleum which are found in solid or liquid state with variable viscosity. These resins react with hardeners and curing agents to create lattice framework structures, with excellent resistance to acids, bases and solvents and good mechanical properties. For these reasons, they are used in thousands of practical applications. The curing process of thermosetting polymers generates a three dimensional network thanks to chemical reaction between the epoxy resin and the hardener, increasing the glass transition temperature (T_g) of the material. It is very important to know how time and temperature have influence in this proc

ess, industrially. In this way, the opening of the epoxy or oxirane rings needs to be studied. They yield the generation of hydroxyls (OH) which allows further crosslinking through appropriate chemical agents. The OH groups generated in the polymerization reaction act as catalysts and increase the initial reaction rate.

Many different analytical methods have been used to characterize the curing reaction and to monitor the curing process of thermosets, such as differential scanning calorimetry (DSC) and Fourier transform infrared spectroscopy (FTIR). Both methods give information on the conversion degree, which by empirical models provide reaction rates and reaction order. Then activation energy can be known by an Arrhenius type equation. The whole information could be used to simulate curing process at different time and temperature.

In this seminary is explaining the curing process of epoxy resin and experimental procedure to study the conversion degree, next some empirical models to calculate kinetic parameters are shown.

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