

A STUDY ON KINETICS OF EPOXY, AMINE, AND QUATERNARY AMMONIUM IONS REACTIONS IN THE EPOXY-NANOCLAY SYSTEMS

Jonghyun Park, Sadhan C. Jana ⁺
Department of Polymer Engineering
College of Polymer Science and Polymer Engineering
University of Akron
Akron, OH 44325-0301

It was found that the quaternary ammonium ions dissociated at elevated temperatures generating amines, which reacted with the epoxide groups, causing an imbalance in stoichiometry between curing agents and epoxy. This led to reduction of crosslink density and further plasticization by excess amines. In this study, we investigated the catalytic effect of quaternary ammonium ions in epoxy-amine systems and the possible reaction between primary amines derived from quaternary ammonium chloride and epoxide group at or over 140 °C. These curing reactions were analyzed with rate constants evaluated for each possible reaction step.