Contract No: 94 YPER 459

Title: Development of New Amino Resins by Controlling their Morphology and Synthesis Parameters

Duration: 01/07/1999 – 31/06/2001

Abstract

In the framework of this project a PhD thesis was carried out by characterising aminoplastic resins through modern analytical techniques such as Gel Permeation Chromatography (GPC), ^{1}H- and ^{13}C- Nuclear Magnetic Resonance Spectroscopy (NMR), Fourier Transform Near Infrared (FT-IR), NIR etc., with the aim to correlate the resin structure with its final properties and thus develop resins of enhanced performance.

In order to understand the effects of changes in synthesis parameters on the structure of UF resins, it was necessary to characterize properly the resins at all production stages, from the formation of the initial urea-formaldehyde addition products, through the formation of intermediate oligomeric species, to the production of the final resin. It was found that the reactions of urea and formaldehyde at different temperatures and pH values result in resins with different structures and properties.

Among the other results of the PhD thesis it could be also mentioned that FT-NIR spectroscopy was found to be invaluable for on-line reaction monitoring, both at laboratory and industrial scale synthesis as it provided a fast and consistent way of monitoring directly the effects of a change of resin formulation ensuring reproducibility and improving overall quality.