

Studying photo-reactions of poly(acryl aryl amide)s by FT-IR spectroscopy

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Photo-Fries rearrangements of poly(acryl aryl amide) and poly(acryl cinnamide) were studied by FT-IR spectroscopy. The photoreaction was monitored by observing the change in spectral intensity of ester C=O stretching mode (1755cm^{-1}) and amide NH bending mode (1510cm^{-1}). The results showed that ester photo-Fries reaction is faster than amide in a polymer structure. It was also observed that the overall reaction rate increases with the inclusion of dimerizable cinnamide structures. Due to wavelength dependence of photo-Fries reaction, no significant reaction was detected by filtering deep UV in the light source. Because the reaction proceeds by radical intermediates, photo-oxidation and photo-crosslinking can occur. These polymers are capable of photo-alignment when exposed to polarized UV light. Using polarized infrared spectroscopy, the developed dichroisms after exposure to polarized UV were examined.