

167i Ionic Liquids Based on Phosphonium, Imidazolium and Ammonium Cations as Pvc Plasticizers: Liquid Leaching, Solid Migration and Cytotoxicity Studies

Mustafizur Rahman and Christopher S. Brazel

Ionic liquids (ILs) have been shown to act as good plasticizers for poly(methyl methacrylate) and poly(vinyl chloride), PVC, with some notable advantages over traditional plasticizers, especially for the development of high temperature stable materials. Another serious issue with development of flexible materials is the loss of plasticizer during normal aging of materials, either through exposure to liquids or contact with non-plasticized surfaces. The ultimate environmental fate of ionic liquid plasticizers is also in question with the limited toxicology data available. Leaching of traditional and ionic liquid plasticizers was studied using distilled water and saline solutions at elevated temperatures, with some ILs providing greater resistance to diffusion than the standard plasticizer, dioctyl phthalate (DOP). Solid-solid migration studies were conducted by sandwiching plasticized PVC films between unplasticized PVC sheets and monitoring mass changes. The ionic interactions of the ILs are thought to give greater molecular cohesion, accounting for the reduced IL migration compared to DOP. To address the potential exposure hazards of using ILs in commercial products, cytotoxicity studies were conducted using *Drosophila Melanogaster* S2 cell culture, with sodium azide as the positive control for comparative toxicology.