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Inverse gas chromatography in the examination of alumina silicate/resin composites

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The series of alumina silicates were used as fillers in composites with phenolic resins. These materials were characterized by means of inverse gas chromatography. The use of fillers as stationary phase in IGC column facilitates estimation of their surface energy including components characterizing ability to dispersive and specific interactions. The technique of inverse gas chromatography allowed quantifying the filler-resin interactions and further estimating the work of adhesion between the two components of composite. We were also able to estimate the degree of curing of the composites in various conditions. It was found that aluminosilicates influence significantly on the curing process of phenolic resins. Moreover, the surface properties affect interactions filler-polymer matrix and consequently homogeneity of the filler dispersion in the polymer matrix. Thus, IGC can be successfully used for quick tests of phenolic composites.

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Recent Publications:

1. A Voelkel, B Strzemiecka, K Adamska and K Milczewska (2008) Inverse gas chromatography as a source of physicochemical data. J. Chromatogr. A 1216(10):1551-1566.
2. B Strzemiecka, A Voelkel, J Donate-Robbles and J M Martin-Martinez (2013) Estimation of polyurethame-carbon black interactions by means of inverse gas chromatography, J. Chromatogr. A 1314:249-254.
3. A Voelkel and B Strzemiecka (2006) Evaluation of degree of cross-linking of resins in grinding tools by using Inverse Gas Chromatography. Acta Chromatographica 16:140-151.

Biography

Adam Voelkel is an Expert in the field of inverse gas chromatography (IGC) theory and its application in the characterization of organic compounds, surface active agents, metal extractants, heavy oil fractions and engine oils; determination of the properties of polymers, polymer blends, interactions in polymer blends. IGC has been also applied in characterization of pharmaceutical excipients, surface of polymers, fillers (modified fillers), nanomaterials and biomaterials. He has also applied IGC in examination of adhesion in biomedical compositions (dental cement-dentine) as well as in raw materials, semi-products and products of abrasive material industry. His research interests include application of chromatographic techniques in material characterization.

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