The 17th International Symposium on Silicon Chemistry Technische Universität Berlin Department of Chemistry, Berlin, Germany August 3–8, 2014

Preparation of Hydrophobic Polysilsesquioxanes and Their Hybridization with Organic Polymers

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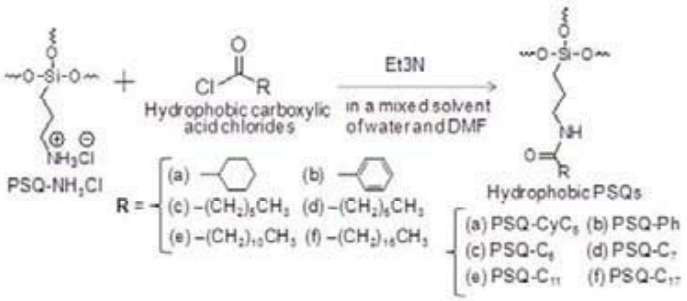
Abstract

Silsesquioxanes (SQs) have attracted much attention in the research fields of organic-inorganic hybrid materials. However, the soluble polySQs (PSQs) with regular structures have only been obtained in the limited cases. So far, we reported that ammonium group-containing rod-like (ladder-like) PSQs with the hexagonally stacked structure (PSQ-NH_3Cl) was successfully prepared by the sol-gel reaction of 3-aminopropyltrimethoxysilane (APTMOS) using aqueous strong acid such as HCl [1)].



Scheme 1. Synthesis of hydrophobic PSQs.

In this study, we synthesized hydrophobic PSQs by the reaction of PSQ-NH_3Cl with various hydrophobic carboxylic acid chlorides in the presence of triethylamine in a mixed solvent of water and DMF (Scheme 1). In addition, we investigated the preparation of the hybrid films of organic polymer, *i.e.* polystyrene and polymethylmethacrylate, with the resulting hydrophobic PSQs.

Reference

1) Y. Kaneko et al., Chem. Mater. 2004, 16, 3417.; Polymer 2005, 46, 1828.; Z. Kristallogr. 2007, 222, 656.; Kobunshi Ronbunshu (Japanese) 2010, 67, 280.; Int. J. Polym. Sci. 2012, 684278.