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One-step Preparation of Soluble Polymer Composed of POSS Units

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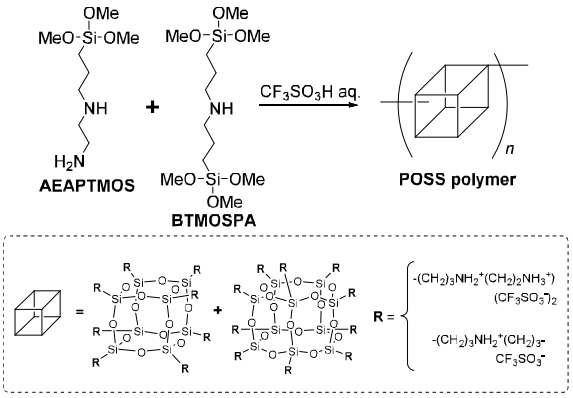
Abstract

Cage-like oligosilsesquioxane (POSS)-containing polymers have attracted much attention because they have potentials to exhibit superior thermal and mechanical stabilities due to siloxane (Si-O-Si) bond frameworks. On the other hands, recently, we reported the facile preparation of POSS compounds by the hydrolytic condensation of amino group-containing organotrialkoxysilanes using superacid such as CF_3SO_3H aqueous solution.[1), 2)] In this study, we found that the soluble polymer composed of POSS units (POSS polymer) was successfully prepared in one-step by hydrolytic condensation of the mixture of two types of amino group-containing organotrialkoxysilanes, 3-(2-aminoethylamino)propyltrimethoxysilane (AEAPTMOS) as a raw material of POSS and bis[3-(trimethoxysilyl)propyl]amine (BTMOSPA) as a cross-linker, using aqueous CF_3SO_3H as a catalyst (Scheme 1).



Scheme 1. Preparation of Soluble Polymer Composed POSS Units.

References

1) Y. Kaneko, M. Shoiriki, and T. Mizumo, J. Mater. Chem., 2012, 22, 14475.
2) T. Tokunaga, M. Shoiriki, T. Mizumo, and Y. Kaneko, J. Mater. Chem. C, 2014, 2, 2496.