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Synthesis Mechanisms and Properties of POSS Compounds

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Polyhedral oligomeric silsesquioxanes (POSS) compounds have generated considerable interest because of their many interesting properties, not the least of which is their resistance to extreme environments. Among their many applications are as viscosity modifiers and pre-ceramics. Despite their importance, the mechanisms by which POSS compounds form has not been well understood. Therefore, we have undertaken a comprehensive study of the possible formation mechanisms for POSS compounds, including the effects of substitutions at various positions and of the solvent. In addition, the possibility of passing small molecules through POSS, or storing small molecules inside POSS cages had been of interest, so we have begun studies of the possibility of passing H_2 , N_2 , and O_2 into POSS cages of varying size. Finally, alternative mechanisms for adsorbing POSS compounds onto the Si(100) surface are being explored.

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