

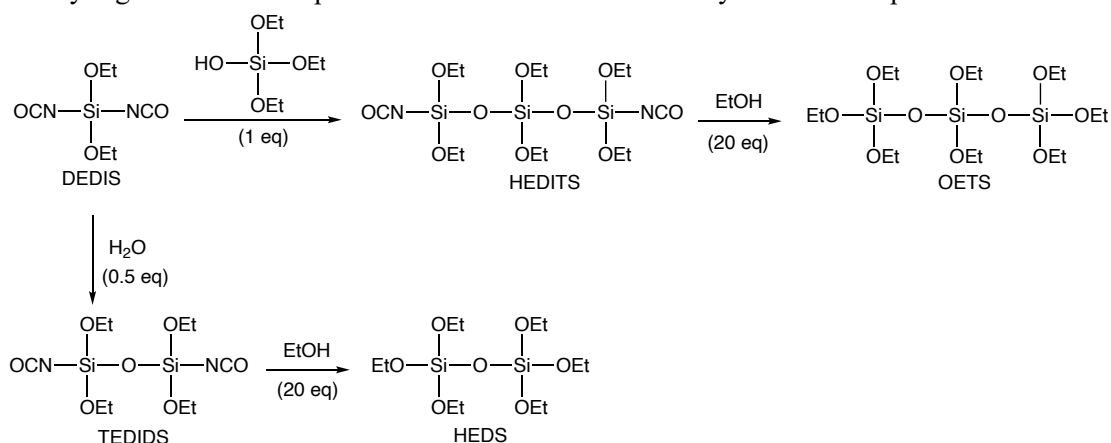
Synthesis and Properties of Diethoxysiloxane Derivatives

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Sol-gel reaction of alkoxysilane is widely used for the synthesis of polysiloxane materials such as silica and silicones. In particular, acid catalyzed sol-gel reaction of alkoxysilane has been expected to form linear alkoxypolysiloxanes. The initial products of sol-gel reaction also have been estimated to generate linear ethoxypolysiloxanes from gas chromatograph/ mass spectrometry. From that point of view, knowledge of linear ethoxypolysiloxanes is considered to be important. However, there have been few reports on the isolation and identification of linear ethoxysiloxanes. In this study, we will report the synthesis and properties of diethoxysiloxane derivatives.

The reactivity of the sila-functional silanes is reported to be in the order $\text{OEt} < \text{NCO} < \text{Cl}$. Isocyanatosilane is attracting attention as a precursor for a selective synthesis of oligosiloxane. Ethoxy(isocyanato)silanes as a starting compound were selected to have difference of reactivity between functional groups. Diethoxy(diisocyanato)silane (DEDIS) was synthesized according to the previous literature¹. Tetraethoxy(diisocyanato)disiloxane (TEDIDS) was obtained in 32 % yield by the hydrolysis of DEDIS. Hexaethoxy(diisocyanato)trisiloxane (HEDITS) was obtained in 44 % yield by the condensation between DEDIS and triethoxysilanol. Hexaethoxydisiloxane (HEDS) and octaethoxytrisiloxane (OETS) were obtained in 12 % and 42 % yield, respectively, by ethanolation of TEDIDS and HEDITS. Mass spectroscopic studies of the hydrolysis products of linear ethoxypolysiloxanes was performed to estimate the reactivity of these compounds.



1) Y. Abe, K. Motoyama, T. Kobayashi, T. Iwasaki, T. Gunji, *Nippon Kagaku Kaishi*, 969-974 (1996).