

Preparation and Evaluation of Calcium Fluorosilicate (CaSiF₆) as a Fluorinating Agent

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Abstract : The calcium fluorosilicate (CaSiF₆) was prepared from calcium silicate (CaSiO₃) with fluorine gas at 25 ~ 200 °C and 760 Torr for 1~24 h. Especially, the pure CaSiF₆ could be prepared at 25 °C for 24 h with F₂ gas from the results of X-ray diffraction. Increasing temperature to higher than 100 °C, the prepared CaSiF₆ was decomposed into CaF₂ and SiF₄. The release of SiF₄ gas was confirmed by the results of gas-phase infrared spectroscopy. In this study, we tried to modify the surface of polycarbonate (PC) resin using the SiF₄ gas released from CaSiF₆ particles. By using the prepared CaSiF₆, the surface roughness of fluorinated PC samples was approximately four times larger than that (1.4 nm) of the untreated sample. The results of X-ray photoelectron spectroscopy indicated the formation of fluorinated bonds (e.g., -CFx) on the surface of PC after surface fluorination. Consequently, the CaSiF₆ particles can be useful for a new fluorinating agent.

Keywords : calcium fluorosilicate, fluorinating agent, polycarbonate, surface fluorination

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