عنوان مقاله:

Chemical State Analysis of Magnesium-Supported Ziegler-Natta Catalyst by Soft X-ray Emission Spectrometer (SXES) after Contact with Alkyl Aluminum

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خلاصه مقاله:

This report is on the characterization of active Ti center in heterogeneous Ziegler-Natta catalysts with Soft X-ray Emission Spectrometer (SXES). Since titanium in the catalyst has various chemical bonds, it is important to grasp the chemical bond state. The outermost shell electrons are very important for understanding the chemical bond state. SXES is the only method that can easily observe outermost shell electrons with current analytical instruments. Here, a co-milled solid of MgCl۲, TiCl۴, and Phthalate was used as a catalyst precursor, and three types of catalysts with significantly different catalytic activity levels were synthesized by changing the subsequent preparation process. The correlation between catalytic activity and the signal shape of Lα,β emission, which is the outermost shell electron of Ti in SXES analysis, was investigated. Lα,β emission was detected as broad signal. It could be observed that the high active catalyst had relatively strong signal intensity at the high energy side. The shape changes were also checked when the catalyst solids were treated by triethylaluminium. By this treatment, the relative intensity of the high energy side signal was further enhanced, suggesting that triethylaluminium treatment induced the elimination of inactive Ti from the catalyst solid. By comparing with the solid ۱۳C-NMR analyses data of the Ziegler-Natta catalyst described in our previous report, the high energy side signal of Ti Lα,β in SXES results implies the relationship with the NMR results for carbonyl function.

کلمات کلیدی:

Ziegler-Natta catalyst, propene polymerization, soft X-ray emission spectrometry (SXES), field emission scanning electron microscopy (FE-SEM), polymerization activity, outermost shell electrons of titanium