



Proceedings of the Fifth Saudi Engineering Conference

13-16 Dhu Al-Qada 1419H / 1-4 March 1999G

Engineering and its Role in the Preservation of National Assets

Volume 4

**MECHANICAL ENGINEERING
CHEMICAL ENGINEERING
PETROLEUM ENGINEERING
NUCLEAR ENGINEERING**

College of Engineering & Islamic Architecture

Umm Al-Qura University

Makkah -Kingdom of Saudi Arabia



CHARACTERIZATION OF HETEROGENIZED ZIRCONOCENE CATALYSTS USING MICROBEAM-PROTON INDUCED X-RAY EMISSION (PIXE) TECHNIQUE

M. Atiqullah^a, M. Ahmed^{b,*}, M. N. Akhtar^a, S. Ahmed^a, and J. H. Khan^a

^aCenter for Refining and Petrochemicals

^bCenter for Applied Physical Sciences

The Research Institute, King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia

ABSTRACT: Et(Ind)₂ZrCl₂ and the MAO cocatalyst, which polymerize ethylene and propylene, were heterogenized on partially dehydroxylated Davison silica 955, by equilibrium adsorption. Dispersions of the catalyst elements, Si, Al and Zr on the silica support were measured using the micro-PIXE technique. The elemental distributions were found to be uniform irrespective of the heterogenization procedures. The Si:Al ratios determined by micro-PIXE technique were close to those measured by spectrophotometric method. However, the Al:Zr ratios measured by micro-PIXE were somewhat lower than those determined by spectrophotometry. This difference has been attributed to the relative size of the diffusing components, and the microbeam size and its probing depth. Micro-PIXE measurements also revealed the presence of several trace impurities such as K, Ca, Ti, Fe, Ni, Cu, and Zn which may potentially poison the resulting catalyst. The order of addition of Et(Ind)₂ZrCl₂ and methyl alumoxane (MAO) to silica during heterogenization did not significantly influence the degree of immobilization. However, heterogenization of the MAO-preactivated Et(Ind)₂ZrCl₂ reduced the degree of immobilization, indicating that the migration of Et(Ind)₂ZrCl₂ from the solution to the support decreased in the presence of MAO.