**Statistical experimental, investigation of PE-gr-TBAEM/BuMgCI supported TiCI, catalyst for C2 H4 polymerization**

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An experimental investigation on the use of two polyethylene based copolymers with dual functional groups, polyethylene-gr-2–tertbuty1 amino ethyl methacrylate (support # 1) and polyethylene-gr-2- dimethyl amino ethyl methacrylate (support # 2) for development of polymer supported TiCI, catalysis for C2H4 polymerization was conducted. The study involved two stages: development of catalyst preparation procedures and identification of important factors for the catalyst preparation procedure in phase 1 of this study, the polymer support was first purified to remove photopolymers and wet ground to make it powder form. BET analysis of the powder showed a specific surface area of 8 $M^2/g$ of polymer support. Three different catalyst preparation methods were investigated: (1) direct immobilization of TiCI, onto polymer support, (2) immobilization of MgCI2/THF/TiCI, onto polymer supports, and (3) modification of polymer a catalyst with relatively high activity, 17 kg. PE/g-Ti-h with polyethylene-gr-2-tertbutyl amino ethyl methacrylate (Support # 2) produced poor activity. In phase II of this study, a twelve run Placket-Burman design was used to screen eleven factors at the catalyst preparation stage using support # 1 with method no 3. Statistical analysis of the results from this design showed that three factors, amount of BuMgCI. Washing temperature with heptane, and washing temperature with TiCI, have strong influences on all three response variables (magnesium loading, titanium loading and catalyst activity). The first two of these factors have positive influences on all three responses, while the third factors has a positive influence on catalyst activity, but negative influences on magnesium loading and titanium loading. Under the conditions tested in this study, the catalysis produced Ti loadings in the range of 0.2. 0.53 wt%. Mg loadings from 0.45 to 1.15 wt%. and activities between 8 and 36 kg , PE/g, Ti.h. The polymerization exhibited acceleration with TiCI, resulted in substantial increase of support surface area, which contributes to the enhancement of the catalyst activity and stability.