

Effect of mixing Pt-Sn catalyst with metal oxides on the propane dehydrogenation

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Recently, there has been increasing demand for propylene and the world has great interest in propane dehydrogenation process and catalyst [1]. Propane dehydrogenation is a direct process to produce propylene [2], which is a raw material for synthetic rubber or plastic. The Pt catalyst has been widely used in the propane dehydrogenation process [3]. Recently, Pt catalyst mixed with metal oxide catalyst has been studied to apply for propane dehydrogenation [4]. In this study, we are intended to investigate the effect of Cu, Mn, Ni metal oxide on the activity of Pt-Sn/Al₂O₃ catalyst for propane dehydrogenation.

Mixing the platinum catalyst with reduced metal oxide catalysts were tested to find out the conversion for propane dehydrogenation. Cu-Mn/ γ -alumina, Cu-Mn/ γ -alumina(bench scale), Cu/ α -alumina, Ni-Mn/ γ -alumina, glass beads mixed with platinum catalyst were compared to find out which oxide assist the catalytic activity of the platinum catalyst. Also, it was compared for dehydrogenation of propane without a reduction of the metal oxide.

As a result of the catalytic activity, platinum catalyst mixed with copper-manganese oxides shows the highest conversion rate 15.2%. And platinum catalyst mixed with copper oxides shows the highest selectivity rate 96.9%.

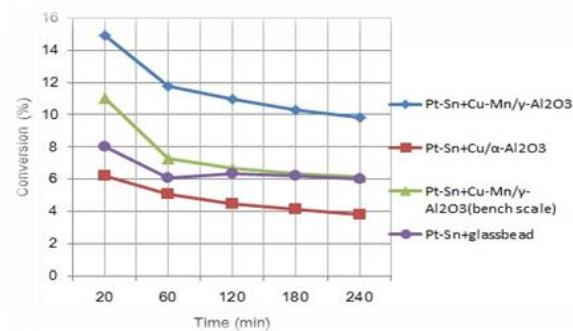


Fig. 1. Propane conversion Pt-Sn/ Al₂O₃ mixed with metal oxide catalyst.

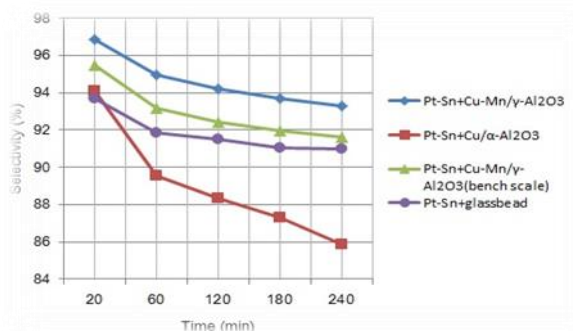


Fig 2. Propane selectivity Pt-Sn/ Al₂O₃ mixed with metal oxide catalyst.

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