

# Study of pretreatment effect on propane dehydrogenation catalyst

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Due to shale gas price of propane has been stabilized in the world market [1]. Propylene from propane dehydrogenation is not only widely used in chemical industries and has received significant attention, but also has been studied to be effective process with catalysts. Bimetallic catalysts, with platinum as the primary metal and a second metal (e.g., Sn, Cu, Ir and Cs) as a promoter, have been studied extensively [2-3].

In this study, 3wt% Pt-1.8wt% Sn were co-impregnated with gamma alumina and theta alumina. Direct-reduction treatment proceeded at 600°C, 800°C, 900°C for 0.5h, 1h, 4h, respectively. These catalysts were treated in many conditions as different temperature and treatment time for direct-reduction treatment. The propane conversion, propylene selectivity and yield were measured through the catalytic test. The effects of different conditions and type of supports on surface of catalyst have been investigated by X-ray diffraction (XRD).

Theta alumina supported catalysts were better than gamma alumina supported catalyst because of the property of heat stability. PtSn alloy peak was higher when direct-reduction temperature increased from 600°C to 800°C in XRD patterns. PtSn alloy peak was disappeared and Pt<sub>3</sub>Sn peak was shown at 900°C. It shows lower activity in propylene yield as increasing direct-reduction temperature and time. Oxidation-reduction treatment was also applied to these direct-reduction treatment catalyst.

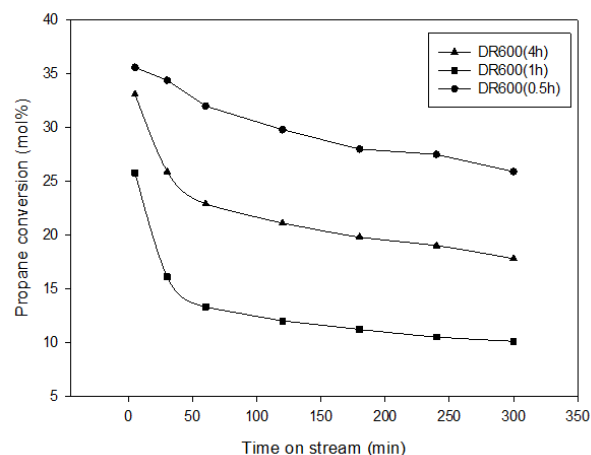


Fig.1 Propane conversion of PtSn/Al<sub>2</sub>O<sub>3</sub> catalysts with different direct reduction time

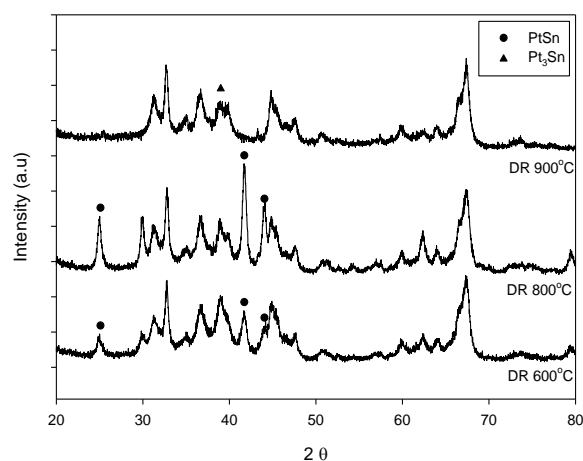


Fig. 2 XRD peak of PtSn/Al<sub>2</sub>O<sub>3</sub> on direct reduction treatment with different temperature.

## REFERENCES

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