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ONLINE ISSN : 1349-273X

PRINT ISSN : 1346-8804

**Journal of the Japan Petroleum Institute**

Vol. 50 (2007) , No. 6 pp.312-321

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## Development of Pt/WO<sub>3</sub>-ZrO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub> Catalyst for Isomerization of Normal Heptane (Part 1) Control of Catalyst Acidity to Improve Isomerization Selectivity

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(Received: January 24, 2007)

The skeletal isomerization of paraffins is effective in improving the gasoline octane number, and platinum catalyst supported on sulfated zirconia (SZ) has been practically used for light naphtha isomerization.

Though the development of heavy naphtha isomerization would also be desired in future, selective isomerization is very difficult to achieve since undesirable cracking proceeds very fast and an effective process has never been reported.

In this study, platinum-supported tungstated zirconia (WZ) catalyst was found to be promising in suppressing the undesirable cracking during heavy naphtha isomerization. In addition, a reaction behavior based on the difference in acidity between both the catalysts to clarify the reactivity difference between light naphtha and heavy naphtha was reported. Using an optimized Pt/WZ catalyst we successfully obtained an isomeric yield of 80% (98% of isomerization selectivity) for a conversion of 82%.

Furthermore, it was proved that WZ has a greater number of weak acid sites instead of less strong and total acid sites as compared with the acidity of SZ, as analyzed by the application of NH<sub>3</sub> adsorption-direct nitrogen analysis to the solid acids.

It was concluded that the catalyst with a higher weak acid ratio has higher selectivity in *n*-C7 isomerization.

**Keywords:** [Isomerization](#), [Normal heptane](#), [Solid super acid](#), [Research octane number](#), [Acidity](#)

To cite this article:

Koichi Matsushita, Makoto Oyamada and Satoshi Aramaki, *Journal of the Japan Petroleum Institute*, Vol. **50**, No. 6, p.312 (2007) .

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doi:10.1627/jpi.50.312

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