ONLINE ISSN : 1349-273X
PRINT ISSN : 1346-8804

Journal of the Japan Petroleum Institute
Vol. 47 (2004) , No. 1 pp.1-10

Skeletal Isomerization of *n*-Heptane to Clean Gasoline

Toshio Okuhara[1)]

1) Graduate School of Environmental Earth Science, Hokkaido University

(Received: May 6, 2003)

Skeletal isomerization of *n*-heptane to clean gasoline can be catalyzed by solid acids such as zeolites, sulfated zirconia, heteropoly compounds, and WO_3/ZrO_2 and their Pt or Pd-modified catalysts (bifunctional catalysts). The catalytic properties of these catalysts for isomerizations of *n*-butane and *n*-pentane are generally reviewed. The activation steps of alkane and factors influencing the activity and selectivity are discussed. Our study on the reaction mechanism for the isomerization of *n*-butane using ^{13}C-*n*-butane is interpreted. The bimolecular mechanism is the main contributor on solid acid catalysts (sulfated zirconia and $Cs_{2.5}H_{0.5}PW_{12}O_{40}$). In contrast, the monomolecular mechanism is predominant over the bifunctional catalysts in the presence of H_2. The reaction pathways of *n*-heptane isomerization are presented and the characteristics of this reaction are discussed. Recent reports and our data for the isomerization of *n*-heptane are summarized and discussed. Pt-$Cs_{2.5}H_{0.5}PW_{12}O_{40}/SiO_2$ and Pd-$H_4SiW_{12}O_{40}/SiO_2$ are comparable to Pt-H-β in selectivity to branched heptanes and the latter heteropoly catalyst has superior activity.

Keywords: Skeletal isomerization, Heptane, Clean gasoline, Solid acid catalyst, Bifunctional catalyst, Reaction mechanism

To cite this article:
Toshio Okuhara, *Journal of the Japan Petroleum Institute*, Vol. **47**, No. 1, p.1 (2004) .

doi:10.1627/jpi.47.1
JOI JST.JSTAGE/jpi/47.1