

Aqueous phase hydrodeoxygenation of oxygenated compounds over bi-functional catalyst

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Aqueous phase hydrodeoxygenation of oxygenates can be used to produce a alkane over metal supported acid catalyst. In this process, reaction pathway involves four key reactions: dehydration, hydrogenation, dehydrogenation and decarbonylation. The reaction step in this pathway is separated as dehydration/hydrogenation step or dehydrogenation/decarbonylation step by catalytic activity. When reactant undergoes dehydration by brønsted acid site in acid support, olefin is produced as a intermediate and alkane is followed by further hydrogenation. On the other hand, aldehyde is produced by dehydrogenation and then CO and lighter alkane are formed by following decarbonylation. In this study, Pt/Nb₂O₅ and Pt/Al₂O₃ were synthesized at different temperature condition and compared in the aqueous phase hydrodeoxygenation of 1,6-hexanediol and 1-propanol. The heat treatment temperature of Nb₂O₅ support affects the textural transition and key reaction intermediates. It also cover the influence of Nb₂O₅ acidity on the electron deficiency of Platinum which was characterized by temperature programmed reduction (TPR), X-ray absorption near edge structure spectroscopy (XANES).