

Selective formation of Hagg iron carbide with g-C₃N₄ as a sacrificial support for Fischer-Tropsch synthesis

박훈민, 윤덕현¹, 이재성^{2,†}

포항공과대학교; ¹Department of Chemical Engineering, University of Texas at Austin; ²울산과학기술대학교
(jlee1234@unist.ac.kr[†])

The Fischer-Tropsch (FT) technology can cover all areas of petroleum not only energy and fuel but also petrochemical products, because this technology produces real oil and olefin during the process. Iron is well known as a good active catalyst material for FT synthesis reaction, especially for their high selectivity to olefin or branched hydrocarbon products. Herein, we prepared the Fe-based catalyst over g-C₃N₄, which accelerates the activating of metallic iron to iron carbide. The iron species with g-C₃N₄ is reduced much easier than which on carbon nanotubes, and after successive FTS reaction conditions, reduced metallic iron is easily carburized. In the consequence, iron catalyst over g-C₃N₄ showed much higher CO conversion than over carbon nanotubes (~80% over g-C₃N₄ and ~20% over carbon nanotubes at the same condition). The phase transition of iron species is investigated by various analysis tools including XRD, XPS, BET, XAFS, TEM, and TPR, etc.