Ammoxidation of propane to acrylonitrile over Mo-V-Te-Nb-O_y catalyst supported on silica materials

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Acrylonitrile is a useful precursor of various products such as resins, rubbers, and carbon fibers. Ammoxidation of propane to acrylonitrile has attracted much attention as a promising process because propane is more abundant and less expensive than propylene. For ammoxidation of propane to acrylonitrile, several catalysts such as Mo-V-Te-Nb-O_y [1] and V-Sb-O_y [2] have been investigated.

Among various catalysts, Mo-V-Te-Nb-O_y catalyst has been widely investigated because of its high activity. However, it is known that commercialization of Mo-V-Te-Nb-O_y catalyst is not easy due to its weak thermal stability and high cost. In order to solve these problems, introduction of supporting material has been attempted [3,4]. Supporting materials are generally inert in the reaction, but they have excellent thermal conductivity. Therefore, it is expected that the use of supporting material for Mo-V-Te-Nb-O_y catalyst may improve the thermal stability of active catalyst.

In this work, Mo-V-Te-Nb-O_y(MVTN)-X (X = Aerosil 200, MCF, and SBA15) catalysts were prepared for use in the ammoxidation of propane to acrylonitrile. The effect of support on the catalytic activities and physicochemical properties of the catalysts was investigated.

Fig. 1 shows the catalytic activities of bulk MVTN and MVTN-X (X = Aerosil 200, MCF, and SBA15) catalysts in the ammoxidation of propane. All the supported catalysts showed higher yield for acrylonitrile than bulk MVTN catalyst. The effect of pore characteristics of supporting materials on the catalytic activities (conversion, selectivity, and yield) of the supported MVTN-X catalysts will be reported and discussed.

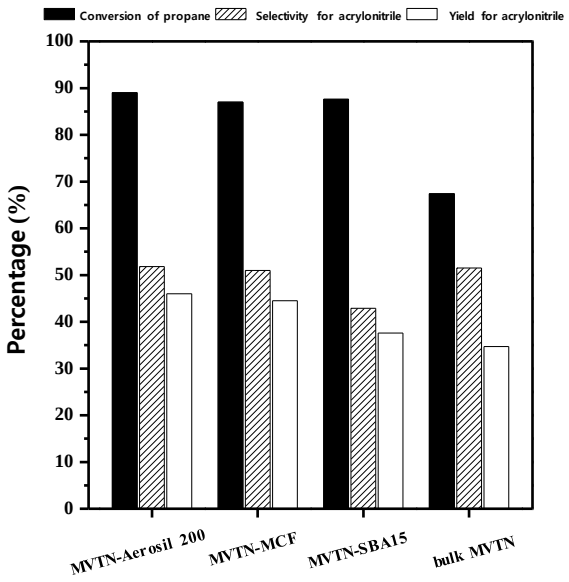

Fig.1 Catalytic performance of bulk MVTN and MVTN-X (X = Aerosil 200, MCF, and SBA15) catalysts in the ammoxidation of propane at 370 ℃.

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