

SYNTHESIS OF HIGHLY DISPERSED OXIDE CATALYSTS ON THE BASE OF EXFOLIATED CLAYS



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The subject of the offer is a novel, affordable and environmentally friendly method of synthesis of oxide catalysts with high surface area dispersed on aluminosilicate supports.

The method may be applied in the production of catalysts for many processes, such as dehydrogenation and oxidation of hydrocarbons or environment pollutants removal - nitrogen oxides reduction and oxidation of volatile organic compounds, in which co-existence of acidic and redox active surface sites plays an important role.

Numerous natural materials, such as energy sources, mineral raw materials, metals and typical chemical compounds are widely used in the industry. The new group of materials with growing industrial application capability are natural layered minerals such as silicates and aluminosilicates (clay minerals), widely distributed in the form of easily accessible deposits in many locations around the globe. Their catalytic properties of layered materials may be improved by intercalation with metal oligocations formed thermally stable pillars in the interlayers. This method increases surface area of the clays, thus providing a suitable exposure of catalytically active centers. However, the main disadvantage of this technique, is that modification of layered structure of aluminosilicates is limited to include metals capable to form stable oligocations.



To solve this problem a novel method of synthesis of catalysts obtained on the basis of clay materials was invented. Materials developed with use of this innovative method may be applied to all technologies that require use of catalysts with active phase deposited on acidic surface (e.g. during dehydrogenation and oxidation of hydrocarbons or reactions fundamental for environment pollutants removal - nitrogen oxides reduction and burning of volatile organic compounds).

In addition to a wide range of possible applications, other advantages of the invention are:

- reduced costs and environmental impact due to exclusion of costly and harmful materials and reagents, e.g. surfactants;
- a 10-fold increase of the surface area comparing to the starting material which allows to expose maximum number of active catalytic and adsorption centers;
- increased exposure of the oxide phase due to exfoliation of the layered structure of aluminosilicates;
- the possibility to adjust the final composition of the produced material by selecting the type and amount of intercalated metals, which generates a wide spectrum of catalysts suitable to apply in various catalytic processes.

The offered solution is subject to a patent application, while further development of the invention is conducted at the Faculty of Chemistry of the Jagiellonian University. Currently the Centre for Innovation, Technology Transfer and University Development (CITTRU) is looking for companies and institutions interested in licensing and application of the presented method.

MORE INFORMATION:

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