

## **Composite catalysts based on carbon nanostructures**

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Composite systems based on carbon structures with nanoclusters of transition metals (Ni, Co, Fe etc.) represent scientific and practical interest for such applications as chemical or petrochemical catalysis, selective sorption, etc. The interest to the catalysts and sorbents based on carbon nanostructures is determined by their unique properties.

This work is devoted to the composites based on a mineral or carbon template, where the carbon nanostructures are grown on the template or deposited on it. Combination of nanostructure properties with the properties of the template affords ample opportunities for the development of novel technologies in catalysis and sorption such as active catalytic systems with enhanced heat conductivity and mechanical durability.

A review and classification of the carbon nanostructure-containing composite materials and their possible applications in catalysis is given in this work along with experimental data on some systems under investigation.

In particular, a composite material was synthesized on the basis of a microfibre carbon felt template. The material was received by catalytic growth of carbon nanotubes on the template from methane at the temperatures 450-700°C. Preliminary treatment of the felt was done by impregnation with catalyst precursor under different conditions. It has been established that the process of methane decomposition on the template is influenced by sample preparation conditions and the deposition conditions. The resulting composite was used for preparation of a number of catalysts. Another composite catalyst for gas chemistry processes was prepared by co-extraction of a zeolite template with carbon nanotubes. The tests of this catalyst showed superior productivity in comparison with the conventional zeolite-based catalyst.