

**AROMATIC HYDROCARBONS OXIDATION IN PICKERING EMULSIONS
STABILIZED BY HALLOYSITE BASED NANOCATALYSTS**

37

*Golyshkin A.V.¹, Swami S.¹, Stavitskaya A.V.¹, Egazaryants S.V.^{1,2}, Ivanov E.V.¹,
Lvov Y.M.^{1,3}, Vinokurov V.A.¹*

¹Gubkin Russian State University of Oil and Gas, Leninskiy prospect 65, Moscow, 119991, Russia

²Lomonosov Moscow State University, Chemistry Department, Leninskiye Gory 1-3, GSP-1,
Moscow, 119991, Russia

³Louisiana Tech University, Ruston, LA 71272, U.S.A.

Oxidation of aromatic compounds by molecular oxygen in liquid phase represent significant interest from economic and ecological points of view. The main products of the oxidation reaction that is often held under temperatures higher than 150°C and pressure are aldehydes, alcohols and acids. That is why maintenance of high selectivity of reaction towards one of the products is important. One of the solutions is to decrease the conversion of raw material but this leads to significant decrease in efficiency of the process.

In this work we attempt to solve a number of technological issues (decrease the temperature and pressure, increase conversion together with the selectivity) by introducing of novel nanocatalysts on the base of natural halloysite nanotubes. Along with high catalytic activity in reactions of aromatic hydrocarbons oxidation, such nanocatalysts form stable Pickering emulsions in water-hydrocarbon systems.

Application of reported catalysts which contain catalytically active Schiff bases-Ruthenium complexes allow to achieve high conversion (30%) of methyl-substituted benzenes (toluene, xylenes) by using atmospheric oxygen at temperatures up to 100 ° C and atmospheric pressure. Due to the high pH value of the aqueous phase produced carboxylic acid transfer to the aqueous phase from the reaction zone and the shift of the thermodynamic equilibrium take place. The high rate of diffusion of the reaction products to the aqueous phase is provided by advanced interfacial surface in Pickering emulsion and thus ensure high selectivity (50%) of the process.

This work was supported by the Ministry of Education and Science of the Russian Federation (Grant № 14.Z50.31.0035)