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Deep hydrodesulphurisation in batch reactor. Effect of aromatics and nitrogen compounds

Anca STERRY*, Lucia ANTONESCU, Ileana CAMENIȚĂ and Ana DINCĂ
Department of Chemistry, Petroleum - Gas University of Ploiesti, Ploieşti 2000, Romania

Abstract Deep HDS was investigated in a batch reactor in presence of commercial $NiMoP/Al_2O_3$ with the observation of the evolution of conversion of model substances: dibenzothiophene (DBT), 4-methyldibenzothiophene (4-MDBT), dimethyldibenzothiophene (4,6–DMDBT). The experiments were made for model substances without and with different concentration of aromatics (nonylbenzene) and basic nitrogen compounds (ortho-propylanilin). The results of HDS were evaluated in form of concentration of model substances as a function of time and of concentration of aromatics and basic nitrogen compounds. The constants of reaction rate as a measure of reactivity of model substances decrease according the following order: $k_{DBT} > k_{4\text{-}MDBT} > k_{4,6\text{-}DMDBT}$. The addition of 20% wt. nonylbenzene as a model substance for the aromatics content had a minor effect in the reduction of HDS kinetic. The increase of basic nitrogen compounds concentration had as a result a more powerful inhibitive effect over the sulphur compounds conversion.

Keywords: Deep hydrodesulphurisation, aromatics, nitrogen compounds

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