**Selective Oxidation of Naphthenic-paraffinic Hydrocarbons of Diesel Fraction in the Presence of Nanosized complexes**

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Organic acids, specially natural petroleum acids (NPA) are important precursors and products of fine and heavy organic syntheses. However, the maximum amount of NPA in petroleum does not exceed 2-3% wt. The oxidizing transformation of petroleum hydrocarbons to afford respective oxygen containing compounds is estimated as effective approach to the rational processing of oil hydrocarbons raw stock. Synthetic petroleum acids (SPA, including oxy-acids, OSPA) obtained by this type of hydrocarbons oxidation, which can successfully replace NPA [1].

Thus, we involve a naphthenic-paraffinic hydrocarbons of diesel fraction as a major research object to conduct the research work to obtain the targeted products. Nanosized complexes [Cr5(tripyridyldiamine)4Cl2] and [Ni5(tripyridyldiamine)4Cl2] as well as its mixture with Zn and Cr salts of natural petroleum acids (ZnNPA,CrNPA) were employed [2]. Dimensions of crystal structure of catalytic complexes was measured by diffractometer NONIUS CAD4 and calculated with aid of NRCVAX13 program. The surface of the crystals was analyzed by atomic-force (scanning probe type) microscope SZLM. It has been determined the derivatogram of the Cr- complex. We can note from the derivatogram of the Cr complex, that the decomposition temperature of the Cr complex is roughly 370°C.

Then the naphthenic-paraffinic hydrocarbons was oxidized in the liquid-phase in the presence of the Cr, Ni complexes and ZnNPA, CrNPA catalysts at 135-140oC for 5.5 hours. There was found an optimal condition for obtaining an oxidate (part of hydrocarbons converted to the oxygen containing compounds) having the maximum acid number (A.N.). According to the results of data (table 3) can conclude that, raw materials losses in the oxidation process are insignificant – a yield of oxidate is ~96-97%. It has been found that the maximum results are obtained in the presence of the mixture of the catalysts. Features of the SPA and SOPA isolated from the oxidate are presented in Table:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Catalytic system  (Ct.) | [Ct], % w/w | A.N. of oxidate, mgKOH/g | SPA | | OSPA | |
| A.N., mgKOH/g | Yield,% | A.N.,  mgKOH/g | Yield,% |
| Ni5(tpda)4Cl2 | 0.1 | 56 | 125 | 18 | 120 | 7 |
| Cr5(tpda)4Cl2 | 0.1 | 41 | 130 | 15 | 122.5 | 7 |
| ZnNPA+comp.Ni | 0.15(0.1+0.05) | 58.3 | 139,1 | 20.5 | 121 | 7.2 |
| ZnNPA+comp.Cr | 0.15(0.1+0.05) | 57 | 132.6 | 19 | 122.3 | 8.8 |
| CrNPA+comp.Ni | 0.15(0.1+0.05) | 57.6 | 130.2 | 21.8 | 124.2 | 6.8 |
| CrNPA+comp.Co | 0.15(0.1+0.05) | 56.2 | 135 | 20.2 | 122.6 | 5.6 |

As can be seen from the Table the oxidation values obtained in the presence of the blended ZnNPA and CrNPA catalysts exceed those of for the other catalysts taken solely.Thus the evidence of synergetic effect is available.

References:

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