Perspective of nanochemistry in oil industry

The reaction of Fe(II) salt with sodium tetrahydridoborates leads to formation iron tetrahydridoborate, and the latter decomposes with producing iron hydride and borane Further iron hydride decomposes with formation of Fe6 nanoscale particle

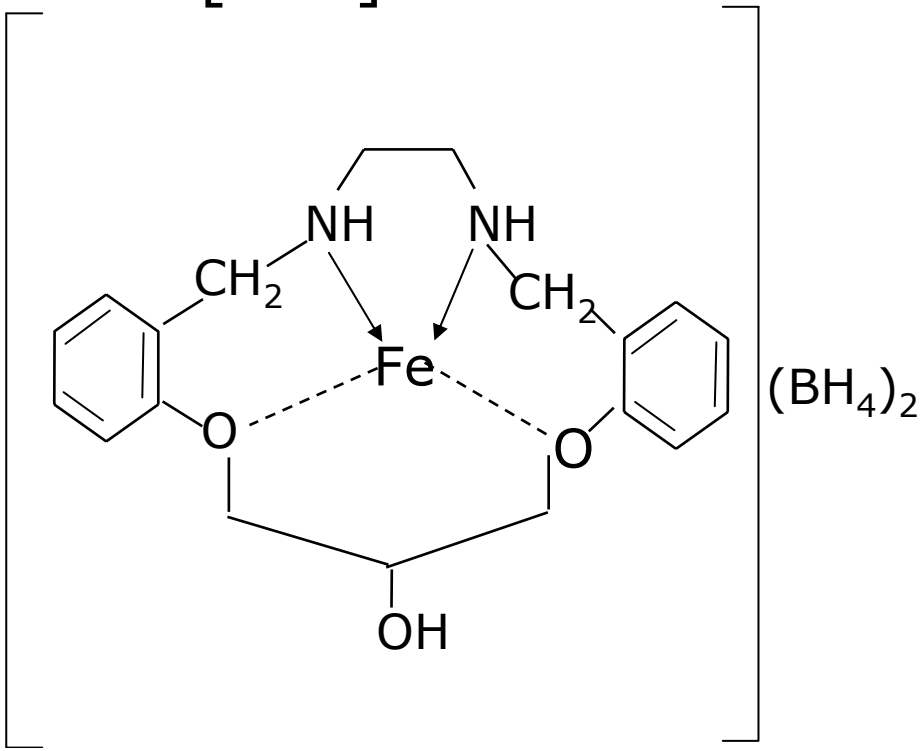
$$FeSO_4 + 2NaBH_4 \rightarrow Fe[BH_4]_2 + Na_2SO_4$$

$$Fe[BH_4]_2 \rightarrow FeH_2 + 2BH_3$$

$$6FeH_2 \rightarrow Fe_6 + H_2$$

With the aim to increase the output of Fe nanocomposite the interphase catalysis method was carried out in double-phases system water-butanol 1:1at the presence of diazacrown ether.

- $Fe[BH_4]_2 + CW \rightarrow FeCW[BH_4]_2$
- $FeCW[BH_4]_2 \rightarrow CW + Fe + 2BH_3 + H_2$

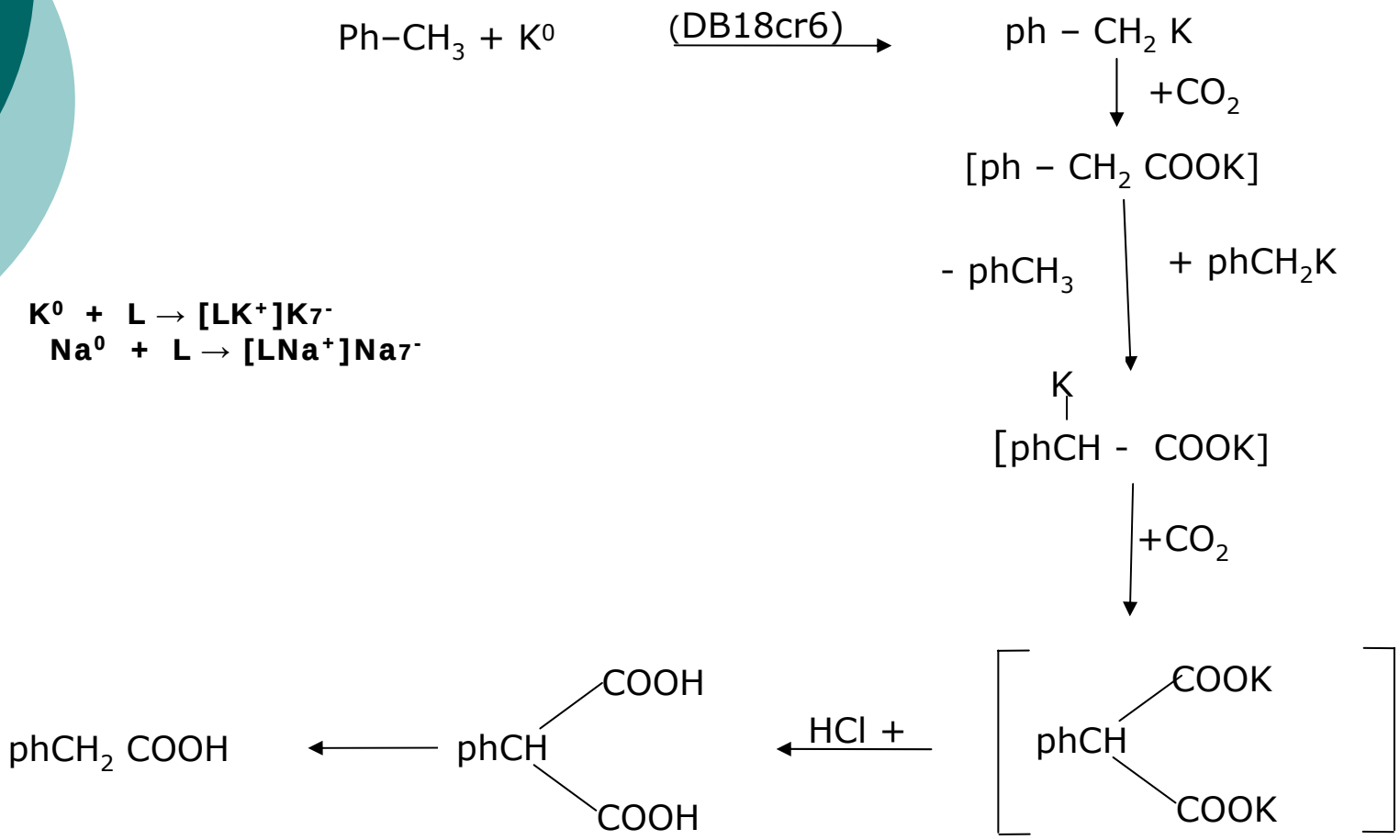


We developed the synthesis of new catalyst for oxidation of methane at the temperatures less than 400 C. With this aim we carried out the reducing of the mixture of $Ba(OCH(CH_3)_2)_2$ and $Al(OCH(CH_3)_2)_3$ in mole ratio 1:6 in isopropyl alcohol by metallic sodium at the present of diazahydroxy substituted dibenzo-15-crown-4.

- $Ba(OCH(CH_3)_2)_2 + Al(OCH(CH_3)_2)_3 \rightarrow BaAl_6$

Obtained nanoscale $BaAl_6$ is catalyst in the process of methane burning at low temperatures.

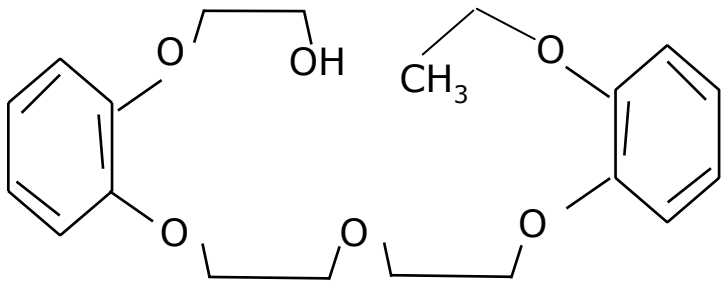
The metallization reaction of alkyl aromatic hydrocarbons at the presence of crown ethers and cryptands.



$K^0 + L \rightarrow [LK^+]K_7^-$

$Na^0 + L \rightarrow [LNa^+]Na_7^-$

The carrying out of the reaction at the temperature above 90^0C leads to opening of crown ether ring with formation of IX.



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