Experimental studies of catalytic properties of Iron II and III modified hydrothermal zeolites

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Zeolites are natural minerals formed by condensation of silica, alumina and some metallic hydroxides under hydrothermal systems [1], known by their porous structure and remarkable catalytic properties related to their high surface area, among others characteristics. Moreover, they present high affinity to absorb gases in their crystalline structure (i.e., H_2, N_2, CO_2), decreasing their activation energy barrier promoting recombination of between them [2]. They may occur in hydrothermal systems where constant emission of hydrogen as a product of weathering of the marine lithosphere can react with the dissolved gases in seawater [3]. Hydrothermal systems are considered present since the Hadean when the Earth's seas had formed. Therefore, the interaction of minerals could enhance the nitrogen reduction as well as its subsequent recombination into larger organics [4].

We present results of enhancement of the surface area, porosity proprieties, and acidity of two synthetic iron II and III zeolites and a feldspar - analcime, phillipsite, sanidine - in comparison to the native mineral. These metallic inclusions in the zeolite structure provoke an enlargement of the internal channels and cavities, as well as creating Brønsted acid sites responsible of a stronger adsorption of N_2 o CO_2.

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Balance of carbon in the system of geochemically linked mire landscapes

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According to V.I. Vernadskiy, migration of chemical elements in biosphere is carried out at direct participation of biogenic matter. The purpose of long-term researches (1996-2011 ye) was studying balance of carbon in bogs. As modeling object for researches it was accepted on territory of Vasyugan mire spurs (West Siberia).

Investigations hade shown, that peat deposits of oligotrophic mires are biochemical active on all structure and the dynamic of biochemical processes is determined by hydrothermal conditions. Process of organic matter transformation in a peat deposit and formations CO_2 is determined by temperature of peatland**.** The greatest concentration of methane in a peat deposit is marked in damp years. As a result of this processes was confirmed with long-term dynamics of gas structure («peepers»-method), carbon balance oligotrophic mires on territory of Vasyugan mire spurs has the following kind.

Position on Landscapes mires	**Receipt of carbon,**	**Allocation of carbon,**	**Deposition of carbon,**
	gC/m^2*year		
Trans accumulative	267.3	97.6	169.7
Transit	235.2	66.9	168.3
Autonomy	158.0	65.2	92.8
Average	**220.0**	**76.6**	**143.6**

Table 1: Carbon balance of Landscapes mires.

In balance of carbon article of the charge determining carrying out of carbon with a drain of mire waters has essential value. According to our results, the average contents of carbon in mire waters, including carbon humid acids, changes from 53 up to 92,5 mg/l with limits 27,8-145 mg/l.

In a result the special kind of mire waters is formed. On the basis of the mathematical model carrying out of organic carbon by mire waters was designed 6,9 g m^2/m^{-1}. But, and in view of losses of carbon with a drain of mire waters, on oligotrophic mires deposition of carbon, and, hence, is observed peat formation process is progresses.

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