

Investigation of Complex Formation Process of Nickel with Fulvic Acids

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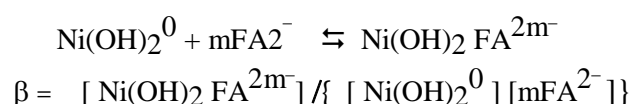
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Fulvic acids actively participate in complex formation processes taking place in natural waters, form stable complexes with heavy metals and stipulate migration forms thereof in natural waters.

In spite of researches, experimental data on stability constants of complex compounds of fulvic acids are heterogeneous. Therefore, it's difficult to investigate complex formation processes taking place in natural waters, identify migration forms of heavy metals and evaluate and assess chemical-ecological condition of natural waters.

We aimed at determining stability constant of nickel fulvic complexes. According to the data found in the literature stability constants of nickel fulvic acids differ in several lines from each other. Value of $\lg \beta$ changes from 3,3 to 7,1.

At pH=8, in diluted solutions, a dominant form of Ni(II) is represented by dihydrocomplexes- $\text{Ni}(\text{OH})_2^0$. If considering fulvic acids as two-base acids, the reaction between Ni dihydrocomplex and the anions of fulvic acids may be written in the following way:



The complexing process was studied by the dissolubility method. The old sediment of Nickel hydroxide was used as solid phase.

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At pH=8, the system Ni-FA-H₂O was studied. It was established, that in such conditions dominates the complex with correlation 1:1. Stability constant of nickel fulvic complex was calculated based on experimental data. $\beta[\text{Ni}(\text{OH})_2\text{FA}]^{2-} = 4,7 \times 10^5$ ($M_w = 6340$), $\beta\text{Ni}(\text{OH})_2\text{FA}^{2-} = 5,2 \times 10^5$ ($M_w = 1350$)