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Investigation of complex formation process of cobalt with fulvic acids, isolated from natural waters

Tamar Makharadze

Ivane Javakishvili Tbilisi State University, Georgia

Fulvic acids have functional groups and that's why they take an active part in complex formation and sorption processes proceeding in natural waters and stipulate migration forms of toxic metals. Objective of the work was to obtain pure samples of fulvic acids, to study complex formation process between cobalt and fulvic acids at pH=7 by the gel chroma-to-graphic method and to calculate conditional stability constant of fulvate complexes. Taking into consideration an average molecular weight of fulvic acids, for the optimal determination was used sephadex G-25. Taking into consideration data of gelfiltration, was determined the quantity of metal connected with the fulvic acids, in such fractions which releasing volumes fits the substances with molecular weight $300 \leq Mw < 5000$. On the basis of experimental data was calculated the conditional stability constant of fulvate complexes by the (1) equation

$$\beta = \frac{[\sum_{M_s} - C'_{M_s}][C'_{M_s}][FA]}{[C''_{M_s}][FA^2]} \quad (1)$$

$$C'_{M_s} = \sum_{M_s} - C''_{M_s} \quad (2) \quad [FA] = C_{FA} - C''_{M_s} \quad (3)$$

where C'_{M_s} - the quantity of metal which was not involved in the complex mole/L;

\sum_{M_s} - the total quantity of metal in main solution.mole/L;

C''_{M_s} - the quantity of metal, connected with fulvic acids (determined fractions $300 \leq Mw < 5000$) mol/L ;

[FA]-free ligand mole/L;

C_{FA} -the total quantity in the system mole/L.

Number value of Conditional stability constant of cobalt fulvate complexes at pH=7 $b = 7,3 \times 10^3$. Obtained data could be successfully used for evaluation the role of fulvic acids in complex formation processes proceeding in all types, groups and class of natural waters. The work was done by supporting the World Federation of Scientists and the World Laboratory.

makharadze_tako@yahoo.com