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Humic acid as a sorbent modifier: humic acid induced synergetic sorption behavior of Prussian blue

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Recent investigations show that sorption properties of solids in natural or synthetic humic acid (HA) solutions strongly depend on the ability of HA to form complexes with ions of sorbate and to interact with the surface of solids. In general, both factors are negative for the sorption technologies due to the known dramatic diminution of sorption processes in HA solutions. We found that industrially produced samples of Fe(II) cyanoferrate(II) (Prussian blue, PB) drastically change their sorption behavior in HA aqueous solutions in comparison with inorganic electrolyte solutions. Numerous experimental data showed that the revealed synergetic sorption of the couple "PB –HA" may be connected with two groups of factors: firstly, an effect of partial HA complex formation by cations in HA-solution which suppresses the known stereoselective sorption properties of d-metals cyanoferrates(II), and secondly, the growth of sorption affinity of some HA complexes of p-, d- and f-metal cations toward PB in the conditions when HA macromolecules don not interact with PB surface due to the same sign of electrostatic charge of interacting particles. In this presentation we show the results of investigation of the system "PB –HA" and discuss the reasons of the revealed enhancement of the sorption affinity of PB toward HA-complexes of ions of I-VI groups of D.I. Mendeleev Periodic System in the framework of the problem of chemical and radiochemical protection of the environment.

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