Fluoride removal by activated iron-manganese nodules

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Iron-manganese nodules could be used as absorbent due to high porosity and specific surface area [1]. A novel absorbent, manganese-iron nodules activated by $FeCl_3$, was prepared for F^- removal [2]. Effects of various physico-chemical parameters such as contact time, initial F^- concentration, temperature and pH on F^- adsorption were studied in terms of batch tests. In addition, column studies and regeneration after adsorption saturation were carried out.

Adsorption capacity increases with the increase in initial F^- concentration (Table 1) and reaction temperature. The adsorption isotherm can be described as Langmuir and Freundlich models. Thermodynamical study reveals that F^- adsorption on the activated material is spontaneous and endothermic, the same as carbon slurry for defluoridation of wastewater [3]. Furthermore, F^- adsorption is relatively independent on pH 3.5-6. Column studies demonstrate that the activated material could efficiently adsorb F^-. Adsorption capacity increases after each regeneration (Fig. 1). Results of XRD and SEM manifest that mechanism for F^- adsorption may result from conglutination of Fe oxides/ hydroxides to the surface of nodules.

initial F^- /mg.L^{-1}	F^- removal /mg.g^{-1}
3	0.134
10	0.401
15	0.585
20	0.727

Table 1: Effect of initial F^- concentration on adsorption at 25°C.

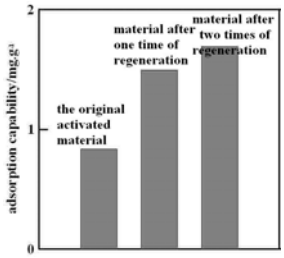

Figure 1: Column experiments on different materials.

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Geochemical characteristics of Late Mesozoic felsic volcanic rocks from North of XiaZhuang and its genetic

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It is the frist time to recognize that three kinds of felsic volcanic rocks which had different stages and different spatial distributions in Late Mesozoic exist in the research areas. In Hekou, Huangzhu, Quannan and Xunwu basin, The felsic volcanic rocks were rhyolitic and/or dacitic sporphyroblastic lava.

Analysed the major element, trace element, REE and the environment of structure on the felsic volcanic rocks of late Mesozoic in north of Xiazhuang , can be get a conclusion: Hekou, Huangzhu and Quan'nan basin consisted of sporphyroblastic lava of cale-alkaline rock series. The REE average total is lowest in Hekou basin, also $(La/Yb)_N$ $(La/Sm)_N$ (Gd/Yb). The REE patterns show the LREE enrichment and right incline, partial LREE is steeper than partial HREE, and Eu thundering obviously in the three basins. All of this indicated the Mesozoic felsic volcanic rocks experienced different separate crystallization or the plagioclase rudimental ratios is different during partial melt in northern Xiazhuang fields. And the substance of felsic volcanic rocks in Hekou, Huangzhu and Quan'nan basin was from the upper crustal ,and formed in post orogenic rectonic settings, it maybe a production of partial melting of metamorphic sedimentary rocks under lower temperature and higher water fugacity condition.

Felsic volcanic rocks in Hekou, Quannan, Huangzhu and Sanbaishan basins produced under compressed stress condition.

[1] Wu, Zhou & Zhang (2002) *Geological Review* **48** (1), 44-53.