

Geochemistry and genesis of bedded siliceous rocks in Carboniferous in Jiangshan, Zhejiang, China

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There is a peculiar type of bedded siliceous rock in the Outangdi Formation of the Late Carboniferous in Jiangshan, Zhejiang Province. The siliceous rocks which interbed with feldspathic quartz sandstone, siltstone and conglomerate, are characterized by white in color, light in weight, porous nature, and the residual bioclasts structure, with plenty of silicized calcareous biology. The study suggests that the siliceous rocks originated from bioclastic limestone through replacement, and the limestone was formed in subtidal shallow beach environment. The porosity of the rocks was made by corrosiveness, weathering and eluviating of bioclasts (such as encrinite caudex) and dolomite (or calcareous matter). The first author named this peculiar type of siliceous rock as 'silicized calc-bioclastic chert'.

The rocks are rich in silicon and calcium. The eigenvalues of petrochemistry support the derivation of silicon from normal groundwater, instead of typical hydrothermal or volcanic activities. Rare earth element contents of the rocks are lower total, flat pattern curves, positive anomaly of thorium. The character of lower total REE is similar to that of limestone, showing the inheritance relationship between the two kinds of rocks. The values of silicon and oxygen isotope are lower, and their variation ranges are similar to those of quartz formed by diagenesis, which demonstrates that the siliceous rocks are of metasomatic genesis in the early diagenetic processes.

Arsenic distribution in colloidal size fractions of high As groundwaters in the Hetao basin, Inner Mongolia

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It is a very important issue whether As can be transported as organic colloids, or not in real groundwater, which is still not established [1, 2, 4]. Eight high As groundwater samples were *in situ* ultrafiltered with N₂ as the protect gas in the Hetao basin, Inner Mongolia. Five successive filtration steps with the nominal size cutoffs 0.45 μm, 100 kDa, 30 kDa, 10 kDa and 5 kDa were used to distinguish between colloids with different size fractions.

Concentrations of As, Fe, DOC vary in fractions '< 0.45 μm', with the ranges from 40 to 1020 μg/L, 0.06 to 0.95 mg/L, and 17.52 to 46.34 mg/L, respectively. Concentrations of Ca, Mg, Na, K, Ba, Sr are not affected by ultrafiltration, while those of As, Fe, Al, Si, DOC, Mn, Mo, U and V show variable through successive filtrations.

Results show that the portions of As in the dissolved size fraction smaller than 5 kDa are dependent on the mol ratio of dissolved Fe to dissolved organic carbon (Fe/C). About 90% As remains in the dissolved fractions for the samples with the Fe/C > 0.009, while around 60% with Fe/C < 0.001. About 15-40% was retained in the ultrafilters and removed for the groundwater samples having the Fe/C between 0.001 and 0.009. Experimental study also showed that As distribution depended on Fe/C ratios [2]. The majority of removed As was observed in the filters with molecular weight of 5-30 kDa. The retained As is believed to be bound to organic colloidal particles [3], especially low molecular organic matters. Since As would interact with organic matter molecules through ternary As-Fe-DOM bridging complexes [2], Fe controls the distribution of As among the size fractions, especially for the samples with Fe/C ratios < 0.009.

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