Whether has platinum group elements (PGE) enriched in sulfide-rich black shale series in Southern Anhui Province?

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The PGE enriched in black shale series can be found in many places in China, such as Yunnan, Guizhou, Hunan, Gansu, as well as in Shanxi Province. In southern Anhui Province, the Early Cambrian black shale series are developed widely. But whether has PGE enriched in sulfide-rich black shale series is unclear.

The black shale series in southern Anhui Province, belonging to Lower Yangtze depression area, located in the Jiangnan deep-fault zone and suffered multi-stage tectonic movements, where magmatic activities show a polycyclic feature. The black shale series of Hetang Formation in southern Anhui is very stable in the whole Yangtze region and it's sequence corresponds with Niutitang Formation in western Hunan and Guizhou. The black shale series in southern Anhui mainly develop carbonaceous chert, carbonaceous shale, Si-bearing carbonaceous mudstone with the horizontal laminar, rhythmic bedding, wavy bedding, striped bedding and water ripple structure and contain star-shaped pyrite and pyrite aggregates in term of laminar distribution locally. The black shale series belongs to marine hydrothermal deposit that represents an abnormal marine sedimentation, and the sediment environment changes from the anoxic reducing environment in early stage to the half-reduction-oxidation environment in late stage [1]. PGE distribute in black shale series in Hunan-Guizhou region, especially in Ni-Mo sulfide ore bed, and spots of PGE can be found in part. The content of Re (Pd) is $1030\sim5550\times10^{-9}$, up to 10280×10^{-9}; Os content is $60\sim150\times10^{-9}$, up to 190×10^{-9}; Pt content is $50\sim580\times10^{-9}$, up to 690×10^{-9}[2].

The black shale series in southern Anhui is the same as Hunan-Guizhou in sequence, geological features, geochemical characteristics and genesis, so there is a great probability for enrichment and metalogeny of PGE in black shale series in southern Anhui. And the black shale series in southern Anhui should be given a systematic study.

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Hydration crystallization process in mafic-felsic mixing magmatic system: A case study from the Dabie orogen (East-central China)

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Hydration crystallization processes, which refer to hydrous minerals-forming reactions in the late stages of magma evolution, have essential influence on the evolution and composition of solid phases and liquids of hydrous magmas as well as on the evolution of water content in residual melts. For quantitatively modeling igneous systems involving hydrous crystllization processes, the knowledge of physico-chemical conditions, i.e. X, T, P, $a\mathrm{H_2O}$, $f\mathrm{O_2}$, prevailing in magmas is a prerequisite.

The Liujiawa intrusion is an igneous complex located at the eastern boundary of the Dabie orogen, consisting of mafic and felsic components of distincitive origins. We identified five lithologically different parts: amphibole-rich cumulate, biotite-pyroxene gabbronorite, diorite, dioritic porphyry and granite. Geochemical data indicate that the gabbronorites ressemble the most primitive basaltic magmas, while the granites represent continental crust-derived magmas. Fractional crystallization and magma mixing processes have generated other lithologies. The low An content (<An60) of plagioclase and the crystallization sequence (opx prior to cpx) indicate a water content lower than 2.8 wt% H_2O in the parental melts. Biotite (16 wt%) is the only hydrous mineral in the gabbronorite, except for trace amounts of amphibole, while biotite is absent in the amphibole-rich cumulate (amphibole 48 wt%). In the diorite, a clear evidence of magma mixing is given by helminthoid clinopyroxene relics in the core of euhedral amphiboles. Textural and chemical data indicate that biotite and amphibole formed from incongruent hydration reactions of orthopyroxene and clinopyroxene, respectively. Continuous formation of amphibole at various T-P-$a\mathrm{H_2O}$ conditions are revealed by systematically varying chlorine and Al concentrations. To summarize, hydrous crystallizations, as part of the vertical evolution of intracontinental magmatism, are responses to various physico-chemical conditions, and the fractionation including hydrous minerals have significant contributions to the petrological and geochemical characteristics of final rocks.