Re-Os and Lu-Hf isotope evidence for the genesis of pyroxenite from Northern Dabie ultrahigh pressure complex belt, eastern central China

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Post collisional magmatism voluminously developed in Dabie orogen. Mafic-ultramafic rocks are minor relative to granitoids, but important in understanding the nature of the underlying mantle. The genesis of these post-collisional rocks is in debate: they generated from subducted Yantze continental lithosphere, or they involved the material at least in part from North China Craton, because the deep suture between two cratons was southward and located in the central region of Dabie orogen during Mesozoic.

Re-Os from five pyroxenites and zircon Lu-Hf from two pyroxenites, three granitic gneisses and three eclogites were analyzed. The Re, Os content and $^{187}Re/^{188}Os$ and $^{187}Os/1^{88}Os$ ratio are quite different from that of mantle peridotites and very similar to that of continental crust. The $^{176}Hf/^{177}Hf$ ratios of zircon for pyroxenite are homogeneous. All initial Hf isotopes for magmatic zircon and metamorphic inherited zircon show systematic decrease with zircon precursor age increasing. The Hf isotopes for pyroxenite zircon show large negative ε_{Hf} value and much older T_{DM} model age relative to crystallized age, and comparable to T_{DM} age of inherited zircons from eclogite and gneiss.

All Re-Os and Lu-Hf isotopes for post-collisional mafic-ultramafic rocks show obviously signature of Yantze craton crust. Like eclogite and gneiss, Meso- and Neo- Proterozoic rocks are proposed to serve as the source of their protolith. Pyroxenite generated by partial melting of thickened Yantze lithosphere. The source material of pyroxenite has no input of North China Craton lithospherel.

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Fluorescence spectroscopy study on solvent density inhomogeneities in supercritical CO_2 mixtures

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The application of Carbon Dioxide (CO_2) is crucial for the Carbon Capture and Storage (CCS) big problem in earth environment science. One of the important application areas is supercritical fluids (SCFs) and supercritical CO_2 (SC CO_2) is widely used in environmental and health application [1] because SC CO_2 is uninflammable and benign property, and easy to handle due to the critical temperature of 304.2 K and the critical pressure of 7.3 MPa.

Recently we focused on the phase behaviour and molecular interactions in SCFs [2-5]. In particular we studied the solvatochromic behaviour of probe molecular in SC CO2 mixtures to explore the solvent density inhomogeneities. UV-Vis spectroscopy study showed in the near critical region of the fluid mixtures the local composition enhancement increased significantly [2].

A new view was represented in this work on the technique by fluorescence probe pyrene in SCFs. We proposed the differential Py scale of pyrene with the pressure order parameter and the molecular interactions were figured out from the study on Py scale in supercritical CO_2 at 308.15 K and in CO_2+pentane mixtures with different compositions over wide pressure range at 323.15 K. It indicates the strong clustering in the critical region occurs in not only pure SC CO_2 but also SCFs mixtures. Combining the local density enhancements by the fluorescence indicator method and isothermal compressibility by the thermodynamic measurement, unusual behaviour of SCFs from microscopic and macroscopic views seems well accordant.

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[1] Eckert *et al*. (1996) *Nature* **383**, p313. [2] Chen *et al*. (2005) *J. Chem. Phys* **122**(20), Art.No.204508. [3] Chen *et al*. (2003) *J. Chem. Eng. Data* **48**(6), 1544-1548. [4] Chen *et al*. (2004) *J. Chem. Eng. Data* **49**(3), 537-543. [5] Shen *et al*. (2005) *Chem-Eur J.* **11**(4), 1228-1234.