Zircon SHRIMP geochronology research for volcanic rocks of the Yingcheng formation from Songliao Basin, NE China

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The Yingcheng formation, mainly composed of rhyolites, act as main reservoir for gas in the Qingshen gas fields of the Songliao basin, NE China, which very resemble with some volcanics hydrocarbon reservoirs in Mesozoic-Cenozoic basins of eastern China [1]. 105 zircon from nine different dills of the early Cretaceous Yingcheng formation in Qingshen gas fields of the Songliao basin are dating. Their SHRIMP U-Pb ages are as range from 111Ma to 115Ma, being the Mid-Cretaceous Aptian to Albian stage. Results of the volcanic erupt ages of the two regions suggest that all the reservoir volcanics are formed at the same period of volcanism, which is different from previously understanding about them. Traditionally the volcanic rocks used to be thought different ages, the volcanic reservoir rocks of Shengping were believed to be younger (K1yc3) than those from Xingcheng (K1yc1), which should be modified according to our results. Result of the paper is very significant to exploring and exploiting volcanic gas pool of the Songliao basin, NE China.

[1] Wu *et al*. (2006) *AAPG Bulletin* **90**, 137–147.

History of lithospheric mantle beneath western Kaapvaal Craton: Signatures from subcalcic garnets

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Subcalcic garnets (S-Grt) hosted in depleted cratonic mantle xenoliths may preserve signatures related to formation and evolution of their host rocks. We studied 18 S-Grt from the shallow mantle beneath the Bellsbank Mine, South Africa, which can be divided into three types.

Type-1 Grt have depleted and lightly fractionated HREE ($(Lu/Er)_N$ = 1-2), suggesting their protoliths were residua of partial melting in the spinel stability field. Strong enrichment of type-2 Grt erased depletion signatures. Type-3 has strongly depleted and highly fractionated HREE ($(Lu/Er)_N$ =6.8). These signatures may indicate their protoliths experienced initial depletion in the spinel stability field, and again after transport to the garnet stability field.

Type-1 Grt have low HFSE/LREE, high LREE /HREE and lower or similar Zr/Hf ratios compared to primitive garnet (P-Grt), but only moderate REE enrichments overall (low Sm/Nd, high Lu/Hf) which can be created by hydrous fluid [1]. Unradiogenic Nd and radiogenic Hf are consistent with Proterozoic enrichment that may be related to the accretion of the Namaqua-Natal orogeny. For type-2 Grt, silicate-carbonatitic metasomatism led to moderate enrichment in HFSE (low Lu/Hf), higher Zr/Hf compared to P-Grt and high Sm/Nd, and with time to high εNd (up to 30) and unradiogenic εHf (down to -58) [2, 3]. A single type-3 Grt has fractionated REE and Ti, Zr, Hf depletion which are consistent with involvement of a fluid. Its εHf –εNd systematics similar to Group II kimberlites suggest that they share a common source.

[1] Stachel *et al*. (1998) *Earth Planet. Sci. Lett*. **159**, 1–12.
[2] Yaxley *et al*. (1991) *Earth Planet. Sci. Lett*. **107**, 305–317.
[3] Brey *et al*. (2008) *J. Petrol*. **49**, 797–821.