Oxygen isotope compositions of Al-rich chondrules from carbonaceous chondrites

Y. WANG[1]*, W. HSU[1], X. LI[2], AND Q. LI[2]

[1]Purple Mountain Observatory, Chinese Academy of Sciences, Nanjing 210008, China (*correspondence: y_wang@pmo.ac.cn)

[2]Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing 100029, China

Al-rich chondrules (ARCs) are rare objects with >10 wt% bulk Al_2O_3 content. They have petrological, chemical, and oxygen isotopic characteristics intermediate between Ca,Al-rich inclusions (CAIs) and ferromagnesian chondrules (FMCs) [1]. ARCs are an unique window to study the orgins of CAIs and chondrules and their genetic relationship.

Eleven ARCs and representative CAIs and FMCs from three CV3 (NWA 2140, NWA 2697, and NWA 989) and Ningqiang chondrites were studied. Olivine, pyroxene, plagioclase, spinel, and Si,Al-rich glasses were analyzed with the Cameca ims-1280 ion microprobe, housed at IGG, Beijing. The oxygen isotope compositions of ARCs form a mixing line with a slope of 0.86±0.04 (Figure 1), close to the CCAM line (slope=0.94) [2]. ARCs have $\Delta^{17}O$ values (0.3~-17.9 ‰) intermediate between CAIs (-1.4~-27 ‰) and FMCs (2.4~-9.8 ‰), indicating that the precursors of ARCs might be mixtures of CAIs and FMCs. Minerals in individual ARCs are heterogeneous in oxygen isotope compositions, with the biggest $\Delta^{17}O$ variation of 15.4 ‰. This imples that during the formation of ARCs, oxygen isotopic exchange with nebular gases might have occurred.

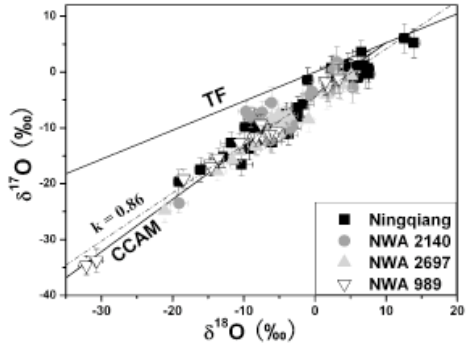

Figure 1: Oxygen isotope compositions of ARCs from Ningqiang and three CV3 chondrites.

[1] Krot & Keil (2002) *MAPS* **37**, 91-111. [2] Yurimoto *et al.* (2008) in *Rev. in Min. & Geochem* **68**, 141-186.

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Geochemical characteristics of different type reservoirs from the Sinian Dengying Formation in Southeastern Sichuan Basin, China

WANG YONG AND SHI ZEJIN[2]

[1] Department of Geochemistry, Chengdu University of Technology, Chengdu 610059, China; e-mail: wangyong10@cdut.cn

[2] State Key Laboratory of Oil and Gas Reservoir Geology and Exploitation, Chengdu University of Technology, Chengdu 610059 , China; e-mail: szj@cdut.edu.cn

Reservoirs in Sinian Dengying Formation can be divided into three categories according to genesis, that is, paleo-karst reservoirs related to tectonic uplift, buried dissolution reservoirs due to burial and dissolution and hydrothermal dolomite reservoirs. Compared with surrounding rocks in Dengying Formation, paleo-karst reservoirs had the characteristics of low Na, high Mn, high Fe, low Sr, low carbon isotope and high $^{87}Sr/^{86}Sr$ value, generally reflecting the fact that the formation of paleo-karst reservoirs was closely related to fresh water. Buried dissolution reservoirs had the characteristics of high Mn, low Fe and low carbon isotopes. The characteristics of high Mn indicated that buried dissolution reservoirs experienced stronger diagenesis modification in the burial environment, while low Fe and low carbon isotopes were related to dissolution effects of organic acids during burial. Hydrothermal dolomite reservoirs had very low contents of Fe and Sr element, significantly partial negative oxygen isotope, and very high $^{87}Sr/^{86}Sr$ value. The formation of these characteristics was related to hydrothermal physical and chemical properties. Three major types of reservoirs in Dengying Formation had significant geochemical response characteristics, which could be taken as geochemical indicators to identify different types of reservoirs.

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