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张铭杰,李延鑫,胡沛青,王先彬,Niu Yaoling,傅飘儿.中国东部陆下岩石圈地幔中的再循环地壳流体组分[J].地

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摘要：

地幔捕虏体中的流体组分记录了地幔演化的信息，可用来认识地幔中再循环地壳组分的性质和来源。采用辉橄榄岩捕虏体组成矿物中流体挥发份的碳、氢和氧同位素组成，结合化学组成(Zhang et al., 2004)综合分析格缺陷和空隙中的流体挥发分主要在高温段(800-1200° C)释出，CO2和CO显示较轻的δ13C值，与世界其它地区地裹体中的流体挥发分主要在低温段(300-600° C)释出。根据中国东部地幔演化事件、地幔矿物性质认为陆下岩石中均存在来源不同的再循环地壳组分：（1）地幔初始流体：主要为耐熔矿物橄榄石在800-1200° C释出的流体组化学组成（主要为CO）与华南克拉通（主要为CO2）明显不同，反映二者拼合前各自演化时期捕获的流体组分。2反映初始流体组分可能为元古代克拉通大陆型岩石圈地幔成分，较轻的CO2 和 CO的δ13C值揭示初始流体中存在1.9Ga的大陆碰撞过程中混入。（2）地幔交代流体：指斜方辉石和单斜辉石800-1200° C释气峰的流体组分，以要组分H2含量(80.73 mm3.STP/g) 明显低于华南克拉通(138.91 mm3.STP/g)，地幔特征的δDH2和δ13CCH4表明交13CCO2,CO和较重δ18OCO2揭示其中存在再循环陆壳流体，其可能的来源为华北与华南中生代拼合过程中的壳幔相体：指二辉橄榄岩捕虏体组成矿物在400-600° C释放出的流体，华北与华南克拉通在流体组成方面相似，壳源特及较轻的δ18OCO2和δDH2O值指示该流体可能为岩石圈地幔减薄过程中引起的再循环洋壳流体，可能与中国东部(或其前身)脱气有关。

关键词：再循环地壳流体 稳定同位素 二辉橄榄岩捕虏体 岩石圈地幔 中国东部

ecycled Crustal Volatiles in Subcontinental Lithospheric Mantle beneath Eastern Chi

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Abstract:

The volatiles in mantle xenoliths can provide the clues of mantle evolution and are used to of recycled crustal volatiles (RCVs) in Earth's mantle. The carbon, oxygen and hydrogen isotopic olivine (Olv), orthopyroxene (Opx) and clinopyroxene (Cpx) of lherzolite xenoliths from eastern C stepwise heating mass spectrometers. The results integrated with chemical composition of volatile that the volatiles resided in early-stage fluid inclusions and structural defects and vacancies h high temperature (800-1200° C), and display lighter δ13C values of CO2 and CO, which is distinct other places of the world. The volatiles trapped in late-stage fluid inclusions have been release 600° C). The RCVs with different potential origins have been identified in three types of volatil subcontinental lithospheric mantle according to mantle evolution events beneath eastern China and Initial volatiles of lithospheric mantle are released at 800-1200° C from Olv etc. refractory min difference in chemical compositions between in Northern China craton (NCC, dominated by CO) and i dominated by CO2), which represent the volatiles trapped in distinct development stage of NCC and combination. They are characterized by δDH2, H2O, δ13CCH4 and δ18OCO2 of mantle origin with light suggested that a little of RCVs mixed into initial volatiles of old craton continental mantle dur collision (1.9Ga). (2) The volatiles in mantle metasomatism are released at 800-1200° C from Opx H2 contents in NCC (80.73 mm3.STP/g) are significantly lower than in SCC (138.91 mm3.STP/g). δDH2 characteristics implied that the main part of metasomatic volatiles are derived from mantle, ligh CO, heavier δ18O of CO2 suggested that a recycled crustal fluid with terrigenous features have be crust-mantle interaction during Mesozoic combination process of NCC and SCC. (3) The volatiles of thinning are released at 400-600° C from Olv, Opx and Cpx of mantle xenoliths, and composed mainl difference between in NCC and in SCC, suggested a common development condition between NCC and SC crustal δ13C of CO2 and CO, biogenic δ13C of CH4, lighter and variable δ18O of CO2, and lighter δ oceanic crustal volatile which could be derived from dehydration of the subducted paleo-Pacific l that lies horizontally in the transition zone beneath eastern China.