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The Significance and Application of Researching Trace Element in Quartz

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Compared with other rock-forming mineral, quartz has strong and special stability and carry much information of diagenesis and mineralization during the process of geological evolution. At the same time, quartz exist in the process of all kinds of geologic process and the change of trace element can reflect different process of geological function. Therefore, testing and analyzing trace element in quartz has important significance for discussing the information of diagenesis and mineralization.

The content of trace element in quartz strongly linked with the composition of fusant. The content of Ti is different between different source magma of quartz; early-stage quartz, in the deep-focus magma chamber, are rich in Ti (Suttner and Leininger, 1972; Schrön et al., 1988). However, the magma with high volatile through differential evolution crystallize quartz, this kind of quartz has the characteristic of high content of Al (Götze et al., 2004). Therefore, through the content of Ti and Al can judge the magma source of quartz; Applying the trace element can invert the source region of quartz. Through researching the content of Al, Ca, Fe, Li and Ti can find that Ca/Fe is different in different source rock of quartz, so the

content of Ca/Fe in quartz is an effective index to identify the source of sedimentary rock (Dennen 1964, 1966, 1967); The content of H is low in magmatogene quartz, but it is high in hydrothermal origin quartz, so use FTIR to test H can distinguish the two kind of quartz (Jourdan et al., 2009); Through researching the REE of quartz, especial the REE distribution patterns, combing different mineralization background and geological conditions can expose metallogenic hydrothermal source and so on. For example, the Gacun deposit, according to the positive anomaly of Eu and the reason of this result is Eu^{2+} access the solution of high temperature ($>320^{\circ}\text{C}$), rich in Cl, acidity ($\text{pH} < 6$) (Michard 1989) can consider that the Ore-forming hydrothermal of this deposit is solution of high temperature, rich in Cl, acidity. At the same time, according to the REE distribution patterns we can also make a conclusion that the deposit go through the Hydrothermal modification in the late period.

Key words: quartz, trace element, REE, source of magma

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