

Stability of zircon at high pressure and temperature

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Zircon (ZrSiO_4) is known to decompose to ZrO_2 (cotunite structure) plus SiO_2 (stishovite) at about 22 GPa, 1273K (Liu, 1979). But Knittle and Williams (1993) reported that zircon did not decompose at about 29 GPa, 1800K. Then the high-pressure and temperature phase relation of zircon is still undetermined.

Phase transitions of zircon, especially the decomposition, have been investigated in the pressure range between 15 and 25 GPa at 1723K with multi-anvil apparatus in this study. In order to examine the reversal reaction, both the synthetic zircon and dioxide mixture ($\text{ZrO}_2 + \text{SiO}_2$) was used for starting materials. These two samples were set in the experimental cell for every run. In the result, the decomposition of ZrSiO_4 was occurred in the pressure range 20-21.3 GPa at 1723K