

Temperature dependence of the elastic moduli of a- and b-quartz up to 1,100 K by the resonant sphere technique

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Temperature dependence of the elastic moduli of single-crystal quartz was measured by means of the resonant sphere technique (RST) from room temperature up to 1,100 K crossing over the a to b transition temperature of 846 K. The elastic moduli of specimen between 840 and 852 K across a- and b-quartz transition were measured in detail every 1 K. The elastic moduli relating to compressional strain, such as C_{11} , C_{33} , C_{12} , C_{13} , $K_1 = (C_{11}+C_{12}+C_{13})/3$, $K_3 = (C_{33}+2C_{13})/3$ and K_S of a- and b-quartz vary rapidly toward the transition temperature, while the elastic moduli relating to shear strain, such as C_{44} , $K_4 = (C_{11}+C_{33}-2C_{13})/4$, $K_6 = (C_{11}-C_{12})/2 = C_{66}$ and G less vary.