

Quartz, SiO₂

This mineral can display more than one symmetry. Analyses are given for each.

This is the phase that is stable at room conditions

Quartz

Ikuta D, Kawame N, Banno S, Hirajima T, Ito K, Rakovan J F, Downs R T, Tamada O
American Mineralogist 92 (2007) 57-63

First in situ X-ray diffraction identification of coesite and retrograde quartz on a glass thin section of an ultrahigh-pressure metamorphic rock and their crystal structure details
4.918 4.918 5.407 90 90 120 *P3_221

0 0 2/3

atom	x	y	z	Wyckoff
Si	0.4696	0	0	3a
O	0.4132	0.2679	0.1191	6c

Raman Active Modes

WP	A ₁	A ₂	E
6c	3	·	6
3a	1	·	3

Total number of modes:

$$4A_1 + 9E = 13$$

This is the phase that is stable at high temperatures:

Quartz

Kihara K

European Journal of Mineralogy 2 (1990) 63-77

An X-ray study of the temperature dependence of the quartz structure

Sample: at T = 848 K

4.9965 4.9965 5.4570 90 90 120 P6₂22

atom	x	y	z	Wyckoff
Si	0.5	0	0	3c
O	0.4152	0.2076	1/6	6j

Raman Active Modes

WP	A ₁	A ₂	B ₁	B ₂	E ₂	E ₁
6j	1	-	-	-	3	3
3c	-	-	-	-	1	2

Total number of modes:

$$1A_1 + 4E_2 + 5E_1 = 10$$