2.3. Measuring apparatus

With exception for the coupling cement, the apparatus used for the measurements was precisely the same as described in [10]) for measurements above 300° K. The sample was separated vertically from the piezoelectric transducer by a 20 to 25 mm long fused silica buffer rod. A very thin layer of phenolic resin paste, described in [12]), was used to couple the sample acoustically to the buffer rod. Contrary to the information given in [12]), the present experiments have shown that this cement can propagate both longitudinal and transverse waves up to temperatures of 923° to 933° K.

The measurements of f_n were carried out in the range of 35 to 45 mc/sec for both types of waves. The recorded temperatures were obtained from a chromel-alumel thermocouple with the hot junction located about 3 to 4 mm from the specimen but in contact with the fused silica buffer. Since errors of 2° or 3° K were possible because of natural thermal gradients in the heated zone and fluctuations in the controlling temperatures it was deemed advisable to limit the temperatures of measurement to 928° K, so as to insure against destroying the single crystal character of the samples by the $\alpha \rightleftarrows \beta$ transformation. In the early stages

Table 1

Temperature ranges at which attenuation of ultrasonic waves prevented measurement of wave velocities
ϱ = density V = wave velocity

Crystal Designation	Direction of wave propagation	Type of mode and shear polarization	Stiffness modulus	Temperature ranges of missing data, (° K)
A, A′	100	Long.	c_{11}	
		Shear, [010]	c_{66}	above 325
		Shear, [001]	c_{55}	600–825
B, B′	010	Long.	c_{22}	580–650, above 850
		Shear, [100]	c_{66}	above 340
		Shear, [001]	c_{44}	above 375
C	001	Long.	c_{33}	
		Shear, [010]	c_{44}	very weak (825–835)
		Shear, [100]	c_{55}	above 825
D	$\theta_T \sim 45.5°$ to [001], 90° to [010]	Quasi-long.	ϱV^2_{D}	above 750
		Quasi-shear, [h0l]	$\varrho V^2_{\mathrm{DS}}$	
		Pure shear, [010]	$\varrho V^2_{\mathrm{DPS}}$	
E	$\theta_E \sim 38°$ to [001], 90° to [100]	Quasi-long.	ϱV^2_{E}	
		Quasi-shear, [0kl]	$\varrho V^2_{\mathrm{ES}}$	above 300
		Pure-shear, [100]	$\varrho V^2_{\mathrm{EPS}}$	above 300
F	$\theta_F \sim 44.5°$ to [100], 90° to [001]	Quasi-long.	ϱV^2_{F}	
		Quasi-shear, [hk0]	$\varrho V^2_{\mathrm{FS}}$	740–860
		Pure-shear, [001]	$\varrho V^2_{\mathrm{FPS}}$	700–823