

**TABLE 1.** Presence or absence of the 3543 cm<sup>-1</sup> absorption band in synthetic quartz according to growth conditions.<sup>a</sup>

Solution	P/T conditions	Seed orientation	Orientation of slice	Growth sector	Color before irradiation	Presence of 3543 cm <sup>-1</sup> band	Color after irradiation	Presence of 3543 cm <sup>-1</sup> band	
K <sub>2</sub> CO <sub>3</sub>	300–350°C, 1,000–1,500 atm	1. Parallel to z	Parallel to a	z	Colorless	No, very rare—hardly visible	Purplish violet	Yes	
				r	Colorless	No, very rare—hardly visible	Dark purple, sometimes both with faint smoky hue	Yes	
				z	Colorless	No, very rare—hardly visible	Purplish violet, sometimes with faint smoky hue	Yes	
				r	From pale yellow to brownish yellow	No	Pale yellowish to brownish yellow, sometimes with faint smoky hue	No	
				z	Pale yellow to yellow	No	Reddish violet to brownish violet	No	
				r	Pale yellow to yellow to pale brown	No	Dark reddish violet to brownish violet, sometimes both with faint smoky hue	No	
			Parallel to c	z	Colorless	No, very rare—hardly visible	Purplish violet	Yes	
				r	Colorless	No	Dark purple, sometimes both with faint smoky hue	Yes	
				Unoriented	z	Colorless	No, very rare—hardly visible	Purplish violet	Yes
					r	Colorless	No	Dark purple	Yes
					z	Colorless	No, very rare—hardly visible	Purplish violet	Yes
					r	Pale yellow to yellow to pale brown	No	Reddish violet to brownish violet	No
		z	Pale yellow to yellow		No	Reddish violet	No		
		r	Pale yellow to yellow to pale brown		No	Dark reddish violet to brownish violet	No		
		2. Parallel to r	Parallel to a and unoriented	r	Colorless	No	Dark purplish violet	Yes	
				r	Yellowish to yellow to pale brown	No	Reddish violet to brownish violet	No	
			3. Parallel to c	Parallel to c	z	Colorless	No, very rare—hardly visible	Purplish violet	Yes
					r	Colorless	No	Dark purple violet	Yes
					z	Colorless	No, very rare—hardly visible	Purplish violet	Yes
					r	Pale yellow to yellow to pale brown	No	Dark reddish violet to brownish violet	No
		z	Pale yellow to yellow		No	Reddish violet	No		
		r	Pale yellow to yellow to pale brown		No	Dark reddish violet to brownish violet	No		
		Parallel to m	z	Colorless	No, very rare—hardly visible	Purplish violet	Yes		
			r	Colorless	No	Dark purple violet	Yes		
			c	Yellow to yellow-orange	No	Yellow to yellow-orange	No		
			z	Colorless	No, very rare—hardly visible	Purplish violet	Yes		
			r	Pale yellow to yellow to pale brown	No	Dark reddish violet to brownish violet	No		
			c	Yellow to yellow-orange	No	Yellow to yellow-orange	No		
			z	Pale yellow to yellow	No	Reddish violet	No		
			r	Pale yellow to yellow to pale brown	No	Dark reddish violet to brownish violet	No		
			Parallel to a	c	Yellow to yellow-orange	No	Yellow to yellow-orange	No	
				+s	Same	No	Same	No	
				+x	Same	No	Same	No	
				-x	Same	No	Same	No	
				z	Colorless	No	Purplish violet	Yes	
				r	Colorless	No	Dark purplish violet	Yes	
				c	Yellow to yellow-orange	No	Yellow to yellow-orange	No	
				+s	Same	No	Same	No	
				+x	Same	No	Same	No	
				-x	Same	No	Same	No	
z	Colorless			No	Purplish violet	Yes			
r	Pale yellow to yellow-orange			No	Dark reddish violet to brownish violet	No			
c	Yellow to yellow-orange		No	Yellow to yellow-orange	No				
+s	Same		No	Same	No				
+x	Same		No	Same	No				
-x	Same		No	Same	No				
z	Pale yellow to yellow	No	Reddish violet	No					
r	Pale yellow to yellow to pale brown	No	Dark reddish violet to brownish violet	No					
NH <sub>4</sub> F	240–350°C, 80–300 atm	1. Parallel to c	Parallel to c and any other surfaces	c, +x, -x, +s, -s, z, r	Colorless	Yes	Purplish violet	Yes	
				+s, -s, +x, and very small -x	Colorless	Yes	Purplish violet	Yes	
	2. Parallel to s	Parallel to m and any other surfaces	+s, -s, +x, and very small -x	Colorless	Yes	Purplish violet	Yes		

<sup>a</sup> Note that the 3543 cm<sup>-1</sup> band also has been documented in synthetic smoky quartz, grown in Na<sub>2</sub>CO<sub>3</sub> solutions (350°C, 1500 atm) on seeds cut parallel to z, with a growth rate more than 0.5 mm/day.