

1. CRYSTAL GEOMETRY AND SYMMETRY

Table 1.4.3.1. Arithmetic crystal classes classified by the number of space groups that they contain

Number of space groups in the class	Symbols of the arithmetic crystal classes					
1	1P 2C 222F 4P 3R 6P 23F	$\bar{1}P$  $\bar{4}I$ 3P	$\bar{3}R$	32R		
2	2P 222C 4I 3P* 31mP 6/mP 23P 43mP	mP 222I 4/mI 312P* 31mP 6m2P 23I 43mF	mC mm2F 422I 321P* 3mR 62mP m3F 43mI	2/mC mmmF 4m2I 3m1P  m3I m3mI	$\bar{4}2mI$ 31mP  432F	3mR   432I
3	mm2C 3P† 4P* m3P	mm2I 312P†  432P*	321P†			
4	2/mP 222P 4P† 6P* 432P†	2mmC 4/mP 622P* m3mP	(= mm2A) 4mmI 6mmP m3mF	mmmI 42mP 6/mmmP	$\bar{4}m2P$	4/mmmI
6	mmmC 422P* 6P†	622P†				
8	422P†	4mmP				
10	mm2P					
16	mmmP 4/mmmP					

\* Enantiomorphs combined. † Enantiomorphs distinguished.

1.4.2. Classification of space groups

Arithmetic crystal classes may be used to classify space groups on a scale somewhat finer than that given by the geometric crystal classes. Space groups are members of the same arithmetic crystal class if they belong to the same geometric crystal class, have the same Bravais lattice, and (when relevant) have the same orientation of the lattice relative to the point group. Each one-dimensional arithmetic crystal class contains a single space group, symbolized by  $\bar{1}$  and  $\bar{m}$ , respectively. Most two-dimensional arithmetic crystal classes contain only a single space group; only  $2mmp$  has as many as three.

The space groups belonging to each geometric and arithmetic crystal class in two and three dimensions are indicated in Tables 1.4.1.1 and 1.4.2.1, and some statistics for the three-dimensional classes are given in Table 1.4.3.1. 12 three-dimensional

classes contain only a single space group, whereas two contain 16 each. Certain arithmetic crystal classes (3P, 312P, 321P, 422P, 6P, 622P, 432P) contain enantiomorphous pairs of space groups, so that the number of members of these classes depends on whether the enantiomorphs are combined or distinguished. Such classes occur twice in Table 1.4.3.1, marked with \* or †, respectively.

The space groups in Table 1.4.2.1 are listed in the order of the arithmetic crystal class to which they belong. It will be noticed that arrangement according to the conventional space-group numbering would separate members of the same arithmetic crystal class in the geometric classes  $2/m$ ,  $3m$ ,  $23$ ,  $m\bar{3}$ ,  $432$ , and  $43m$ . This point is discussed in detail in Volume A of *International Tables*, p. 728. The symbols of five space groups [ $C2me$  ( $Aem2$ ),  $C2ce$  ( $Aea2$ ),  $Cmce$ ,  $Cmme$ ,  $Ccce$ ] have been conformed to those recommended in the fourth, revised edition of Volume A of *International Tables*.