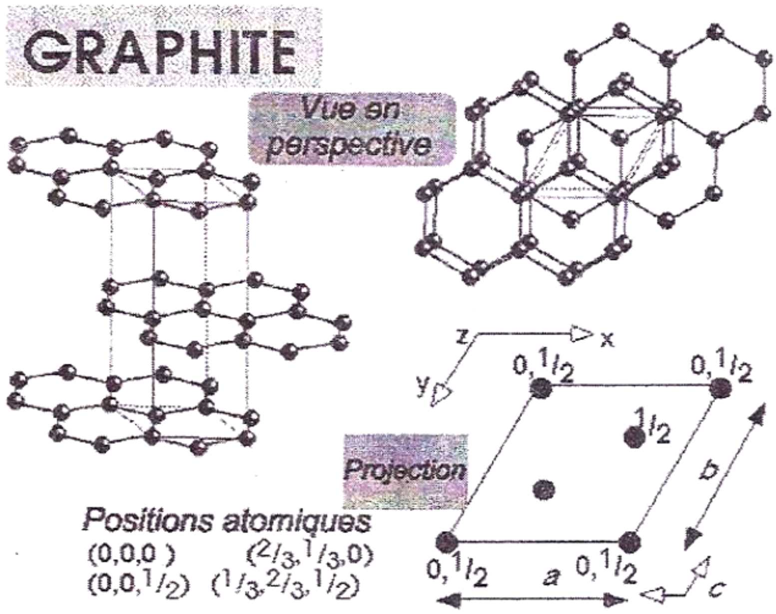
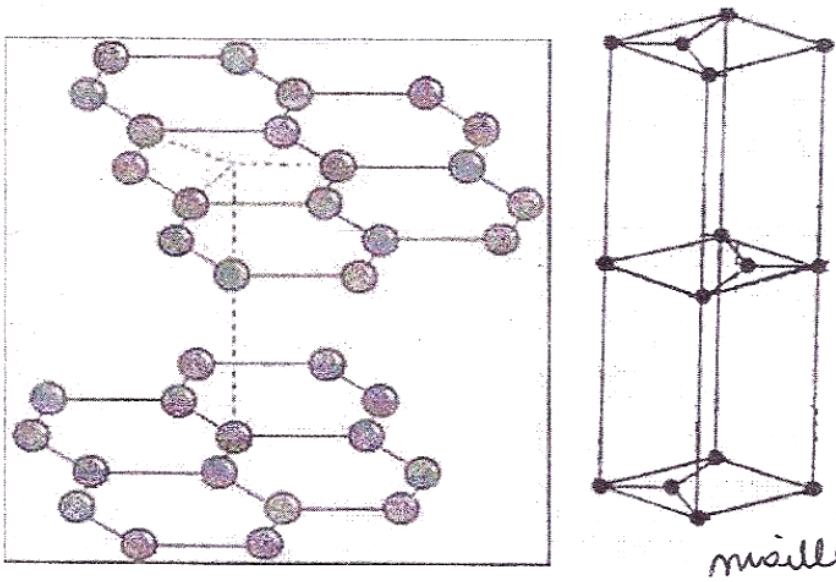


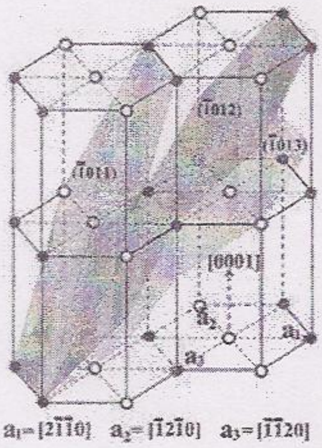


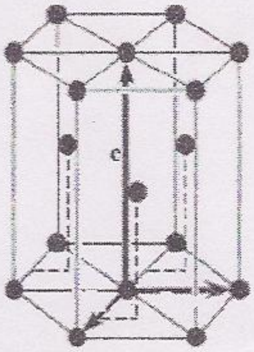
maille de graphite

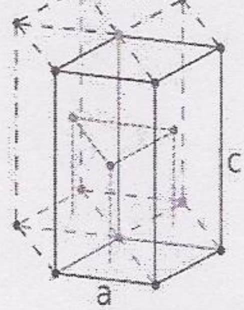
*548/14 « symétrie et structure cristallochimie du solide », Jacques Angenault.

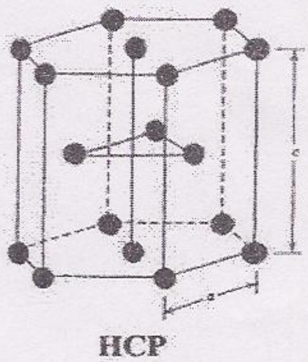
* 548/18 « exercices et problèmes de cristallographie », François Mathieu.

- Réseau de Bravais: hexagonal
- positions des atomes: $(0,0,0), (\frac{2}{3}, \frac{1}{3}, 0), (0,0,\frac{1}{2}), (\frac{1}{3}, \frac{2}{3}, \frac{1}{2})$



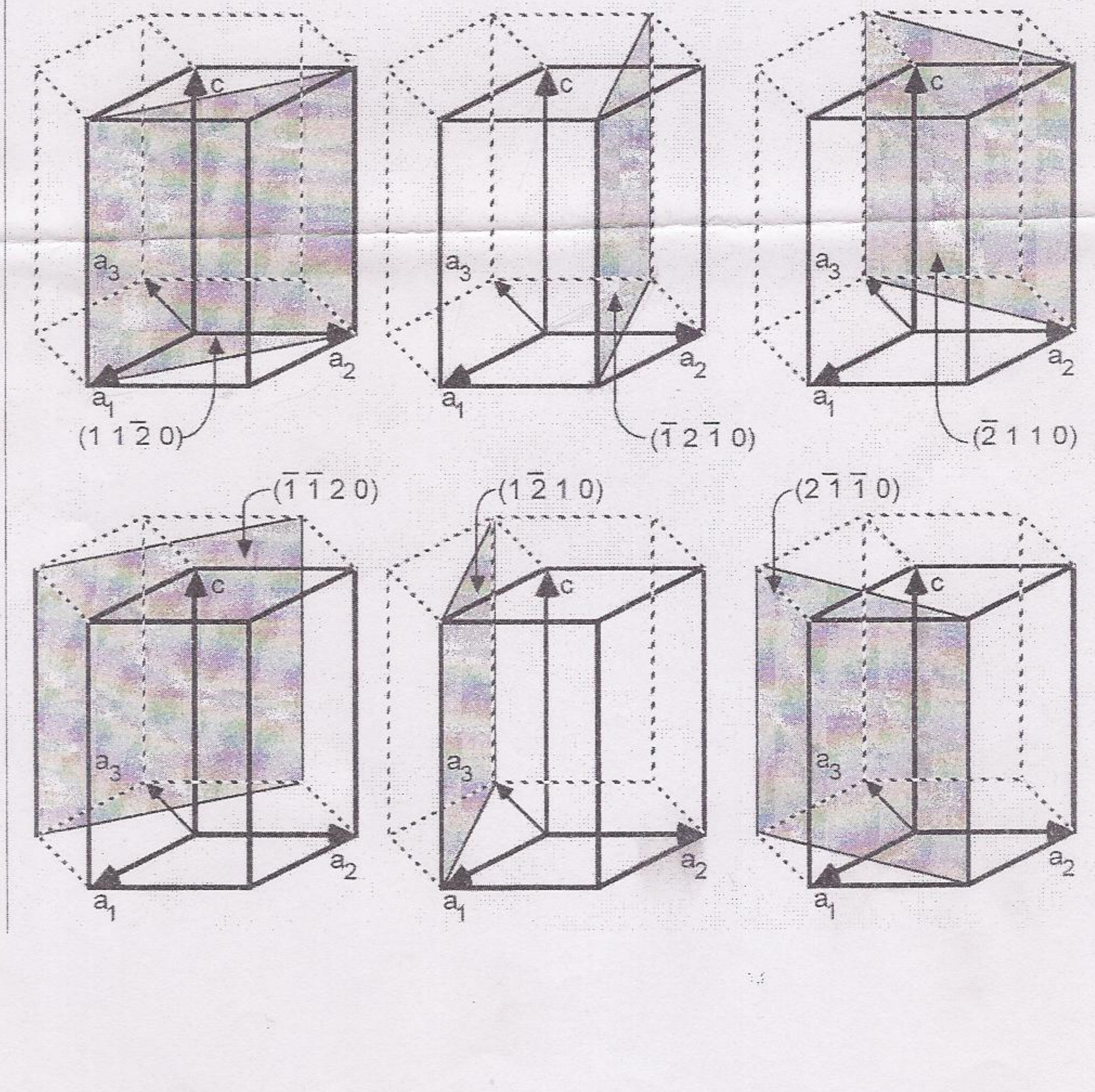




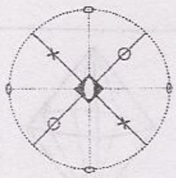
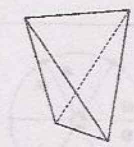


HCP

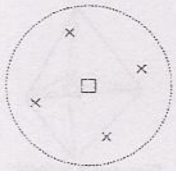
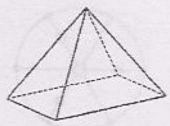
$(1\,1\,\bar{2}\,0)$ $(\bar{1}\,2\,\bar{1}\,0)$ $(\bar{2}\,1\,1\,0)$ $(\bar{1}\,\bar{1}\,2\,0)$ $(1\,\bar{2}\,1\,0)$ $(2\,\bar{1}\,\bar{1}\,0)$



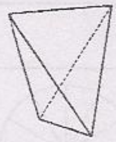
$\bar{4}2m$ (suite)

{hhl}		 Tétraèdre tétragonal
{hk0}		Prisme ditétragonal
{100} {110}		Prisme tétragonal
{001}		Pinacoïde

Classe 4 (C_4) Élément : A_4

{hkl}		 Pyramide tétragonale
{h0l} {hhl}		Pyramide tétragonale
{hk0}		Prisme tétragonal
{100} {110}		Prisme tétragonal
{001}		Monoèdre

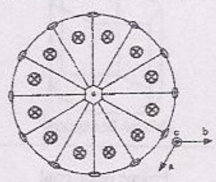
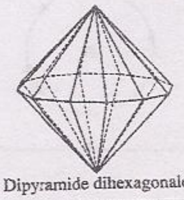
Classe $\bar{4}$ (S_4) Élément : $\bar{A}_4$

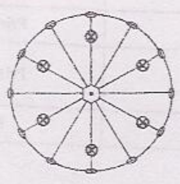
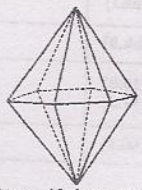
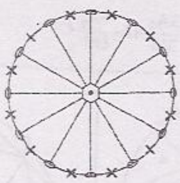
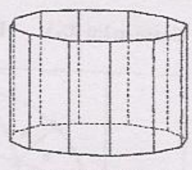
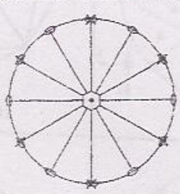
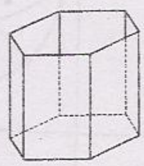
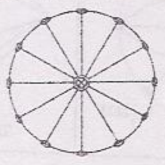
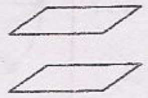
{hkl}		 Tétraèdre tétragonal
{h0l} {hhl}		Tétraèdre tétragonal
{hk0}		Prisme tétragonal
{100} {110}		Prisme tétragonal
{001}		Pinacoïde

Système hexagonal

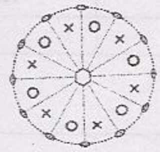
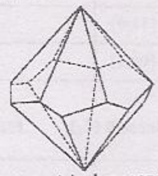
Pour les cristaux dont le réseau est hexagonal, les 5 classes du système trigonal doivent être rattachées au système hexagonal.

Classe 6/mmm (D_{6h}) Éléments : $\frac{A_6}{M}\frac{3A'_2}{3M'}\frac{3A''_2}{3M''}C$

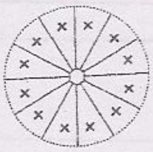
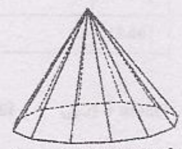
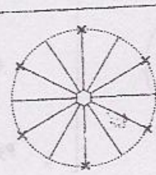
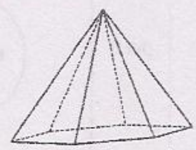
{hk.l}		 Dipyramide dihexagonale

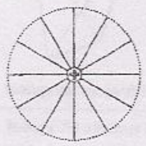
{h0.l} {hh.l}		 Dipyramide hexagonale
{hk.0}		 Prisme dihexagonal
{10.0} {11.0}		 Prisme hexagonal
{00.1}		 Pinacoïde

Classe 622 (D_6) Éléments : $A_6 3A'_2 3A''_2$

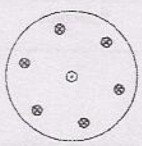
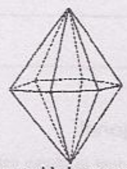
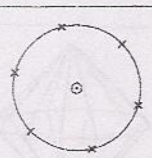
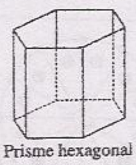
{hk.l} {hh.l}		 Trapèzoèdre hexagonal
{h0.l} {hh.l}		Dipyramide hexagonale
{hk.0}		Prisme dihexagonal
{10.0} {11.0}		Prisme hexagonal
{00.1}		Pinacoïde

Classe 6mm (C_{6v}) Éléments : $A_6 3M' 3M''$

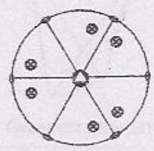
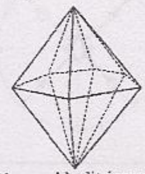
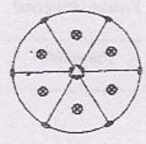
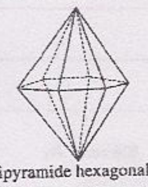
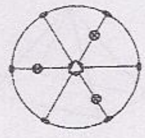
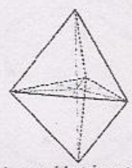
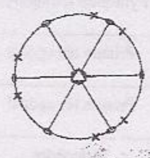
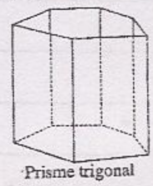
{hk.l}		 Pyramide dihexagonale
{h0.l} {hh.l}		 Pyramide hexagonale

{hk.0}		Prisme dihexagonal
{10.0} {11.0}		Prisme hexagonal
{00.1}		monoèdre

Classe 6/m (C_{6h}) Éléments : $\frac{A_6}{M}C$

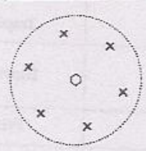
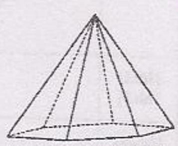
{hk.l}		 Dipyramide hexagonale
{h0.l} {hh.l}		Dipyramide hexagonale
{hk.0}		 Prisme hexagonal
{10.0} {11.0}		Prisme hexagonal
{00.1}		Pinacoïde

Classe $\bar{6}$2m (C_{3h}) Éléments : $\frac{A_3}{M}3A'_2 3M''$

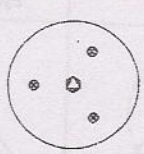
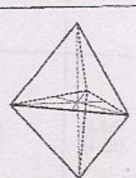
{hk.l}		 Dipyramide ditrigonale
{h0.l}		 Dipyramide hexagonale
{hh.l}		 Dipyramide trigonale
{hk.0}		 Prisme trigonal

{10.0}		Prisme hexagonal
{11.0}		Prisme trigonal
{00.1}		Pinacoïde

Classe 6 (C_6) Élément : A_6

{hk.l}		 Pyramide hexagonale
{h0.l} {hh.l}		Pyramide hexagonale
{hk.0}		Prisme hexagonal
{10.0} {11.0}		Prisme hexagonal
{00.1}		Monoèdre

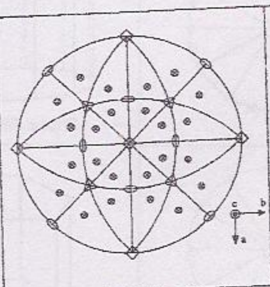
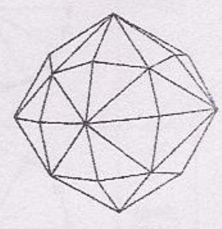
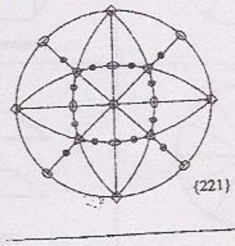
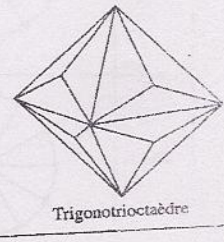
Classe $\bar{6}$ (C_{3h}) Élément : $\frac{A_3}{M}$

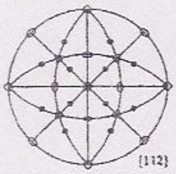
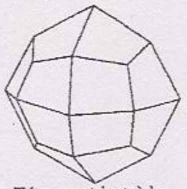
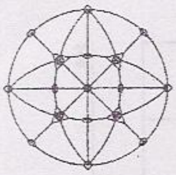
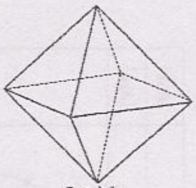
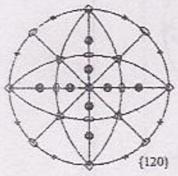
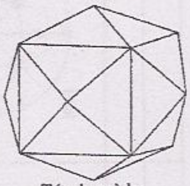
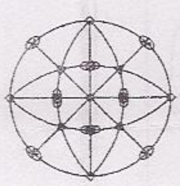
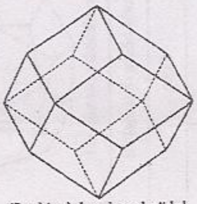
{hk.l}		 Pyramide trigonale

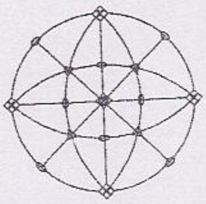
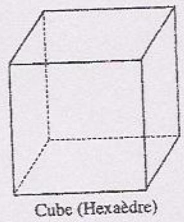
{h0.l} {hh.l}		Dipyramide trigonale
{hk.0}		Prisme trigonal
{10.0} {11.0}		Prisme trigonal
{00.1}		Pinacoïde

Système cubique

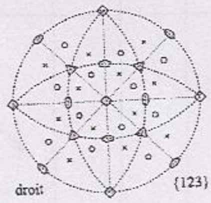
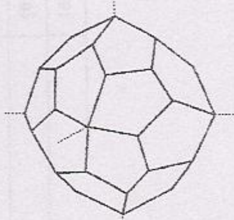
Classe m3m (O_h) Éléments : $\frac{3A_4}{3M}4A_3\frac{6A'_2}{6M'}C$

{hkl}		 Hexaoctaèdre
{hhl} $h > \ell$		 Trigonotrioctaèdre

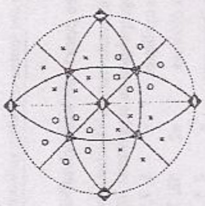
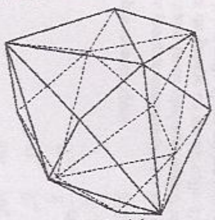
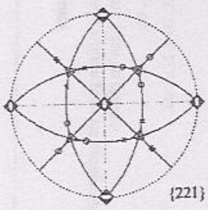
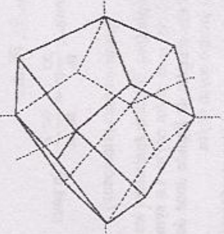
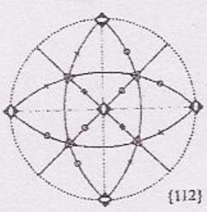
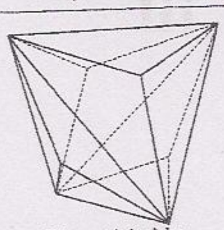
{hhl} h < ℓ	 {112}	 Tétragonotrioctaèdre
{111}		 Octaèdre
{hk0}	 {120}	 Tétrahexaèdre
{110}		 Dodécaèdre rhomboïdal

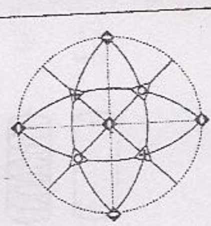
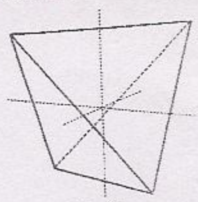
{110}		 Cube (Hexaèdre)

Classe 432 (O) Éléments : $3A_4\ 4A_3\ 6A'_2$

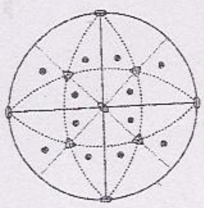
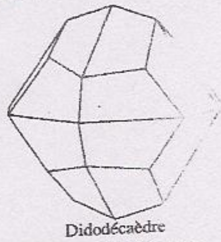
{hkl}	 droit {123}	 Pentagonotrioctaèdre (droit)
{hhl} h > ℓ		Trigonotrioctaèdre
{hhl} h < ℓ		Tétragonotrioctaèdre
{111}		Octaèdre
{hk0}		Tétrahexaèdre
{110}		Dodécaèdre rhomboïdal
{100}		Cube

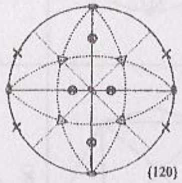
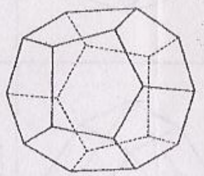
Classe $\bar{4}3m$ (T_d) Éléments : $3\bar{A}_4\ 4A_3\ 6M'$

{hkl}		 Hexatétraèdre
{hhl} h > ℓ	 {221}	 Tétragonotritétraèdre
{hhl} h < ℓ	 {112}	 Trigonotritétraèdre

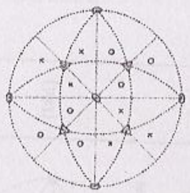
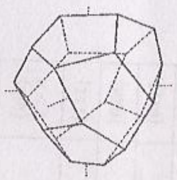
{111}		 Tétraèdre
{hk0}		Tétrahexaèdre
{110}		Dodécaèdre rhomboïdal
{100}		Cube

Classe m3 (T_h) Éléments : $\frac{3A_2}{3M}\ 4A_3\ C$

{hkl}		 Didodécaèdre
{hhl} h > ℓ		Trigonotrioctaèdre
{hhl} h < ℓ		Tétragonotrioctaèdre
{111}		Octaèdre

{hk0}		 Dodécaèdre pentagonal
{110}		Dodécaèdre rhomboïdal
{100}		Cube

Classe 23 (T) Éléments : $3A_2\ 4A_3$

{hkl}		 Pentagonotritétraèdre (gauche)
{hhl} $h > \ell$		Tétragonotritétraèdre
{hll} $h < \ell$		Trigonotritétraèdre
{111}		Tétraèdre
{hk0}		Dodécaèdre pentagonal
{110}		Dodécaèdre rhomboïdal
{110}		Cube

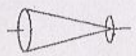
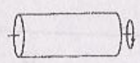
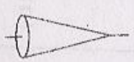
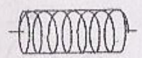
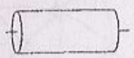
Groupes ponctuels non cristallographiques

Leur dénombrement s'effectue avec la méthode utilisée pour les groupes ponctuels cristallographiques en supprimant les contraintes liées au réseau.

Groupes cycliques	n	5, 7, 8, 9, 10..., ∞
Groupes diédraux	n2	52, 72, 822, 92, 10 2 2..., ∞2
Groupes impropres	$\bar{n}$	$\bar{5}, \bar{7}, \bar{8}, \bar{9}, \overline{10}$...
	n/m	8/m, 10/m..., ∞/m (n pair)
	nm	5m, 7m, 8mm, 9m, 10mm..., ∞m
	$\bar{n}2$	$\bar{5}2, \bar{7}2, \bar{8}2m, \bar{9}2, \overline{10}m2$...
	$\frac{n}{m}m$	$\frac{8}{m}mm, \frac{10}{m}mm..., \frac{\infty}{m}m = \frac{\infty}{m}\frac{2}{m}$ (n pair)
Groupes icosaédriques		$532, \bar{5}\bar{3}\frac{2}{m}$ (plusieurs axes principaux)

Les groupes *continus* ont un axe d'isotropie (∞). Il existe également les groupes sphériques (avec plusieurs axes d'isotropie) ∞ ∞ et ∞/m ∞/m. La symétrie des objets du groupe ∞ ∞ est celle d'une sphère remplie de liquide doué de pouvoir rotatoire et celle d'une sphère pour ceux du groupe ∞/m ∞/m.

Les 5 groupes continus avec un axe d'isotropie peuvent être représentés par les objets suivants (utilisables pour l'application des lois de Curie) :

∞		Cône tournant avec une vitesse uniforme.
∞/m		Cylindre tournant avec une vitesse uniforme. Vecteur axial (tenseur antisymétrique loi de transformation : $r_i' = \pm a_{ij}r_j$)
∞m		Cône de révolution. Vecteur polaire (tenseur, loi de transformation : $r_i' = a_{ij}r_j$)
∞2		Hélice droite infinie ou cylindre rempli d'un liquide doué de pouvoir rotatoire.
$\frac{\infty}{m}\frac{2}{m}$		Cylindre de révolution.

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