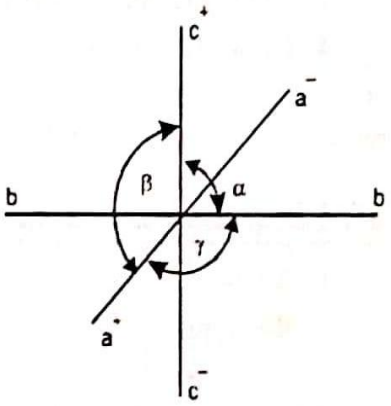
10.13. TRICLINIC SYSTEM

10.13.1. Definition

Those crystals which can be referred to three crystallographic axes, all of which are essentially unequal in length and inclined at various angles to each other, are grouped under triclinic system.

10.13.2. Axial Diagram

The proper orientation of a crystal of this system would be in which any **one** of the crystallographic axes is given a **vertical position** and is designated as *c* **axis**. Of the remaining two crystallographic axes, the one which is **shorter** and **sloping** towards the observer may be designated as **a axis** (brachy axis). The third axis then running approximately **right to left** and is designated as *b*-**axis** (macro-axis). (Fig. 10.35)



Axial Diagram in Triclinic System

Fig. 10.35.

Following is the scheme of nomenclature for the angles between the three axes:

α = angle between *b* axis and *c* axis;
β = angle between *a* axis and *c* axis;
γ = angle between *a* axis and *b* axis

10.13.3. Normal Class

There are only **two symmetry classes** falling in the Triclinic System. The normal class is named **axinite** type after the mineral.

(*i*) **Axes of Symmetry-none.**

(*ii*) **Planes of Symmetry-none.**

The class is characterized by only a centre of symmetry which is the point of intersection of the three crystallographic axes.

10.13.4. Forms

All the forms of monoclinic system are found in the crystals of this system also. **The main feature of the forms of the triclinic system is that each form has only two faces symmetrical with respect to the centre of symmetry of the crystal.** These are, therefore, **hemiforms.**

1. Pinacoids. These are open forms, **each of two faces**, meeting only one axis and being parallel to the other two.

Three types of pinacoids are found in the Triclinic System also as in the Monoclinic and Orthorhombic systems.

(*i*) ***a*-pinacoid (100)**: also called macropinacoid

(*ii*) ***b*-pinacoid (010)**: also called brachypinacoid has two faces each meeting the *b*-axis at unit length.

(*iii*) ***c*-pinacoid (001)** also called **base** has two faces, each intersecting the *c*-axis.

2. Prisms. These are open forms of **two faces** only in the Triclinic System; hence they are also called **hemi-prisms**. Their general symbol is **hko**. In all, four prismatic faces with the above symbol are possible, but since there are no planes of symmetry, these four faces will occur in two groups, each being symmetrical to a **centre of symmetry only**.

3. Domes. In the Triclinic System, domes are also **hemiforms**, that is, these contain only one half of the usual number of faces.

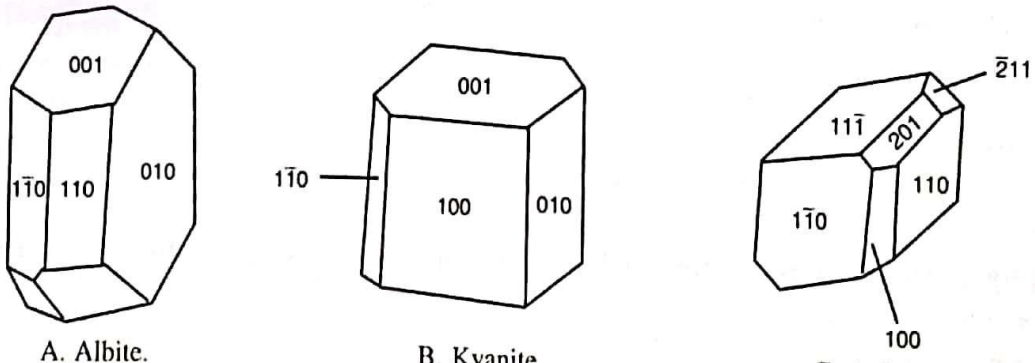
The **macrodome** has **two faces**, with a symbol of (hol).

The **brachydome** has **two faces** with a symbol of (ohl).

4. Pyramids. Four types of pyramids each with two faces only and each face cutting the vertical axis exist in the Triclinic System. These are called **Tetrato-bipyramids** (4 bifaced pyramids) represented by the symbol (hkl); Fig. 10.36; 211

10.13.4. Examples of Triclinic Minerals

1. Albite
2. Kyanite
3. Axinite
4. Microcline
5. Anorthite
6. Rhodonite
7. Turquoise



A. Albite. B. Kyanite. C. Axinite.

Some Minerals of Triclinic System

Fig. 10.36.