Miller Index

Miller indices are a notation system in crystallography for planes and directions in crystal (Bravais) lattices.

In particular, a family of lattice planes is determined by three integers ℓ, m, and n, the Miller indices. They are written (hkl), and each index denotes a plane orthogonal to a direction (h, k, l) in the basis of the reciprocal lattice vectors. By convention, negative integers are written with a bar, as in 3 for −3. The integers are usually written in lowest terms, i.e. their greatest common divisor should be 1. Miller index 100 represents a plane orthogonal to direction ℓ; index 010 represents a plane orthogonal to direction m, and index 001 represents a plane orthogonal to n.

There are also several related notations

- the notation {ℓmn} denotes the set of all planes that are equivalent to (ℓmn) by the symmetry of the lattice.

In the context of crystal directions (not planes), the corresponding notations are:

- [ℓmn], with square instead of round brackets, denotes a direction in the basis of the direct lattice vectors instead of the reciprocal lattice; and
- similarly, the notation ⟨hkl⟩ denotes the set of all directions that are equivalent to [ℓmn] by symmetry.

Miller indices were introduced in 1839 by the British mineralogist William Hallowes Miller. The method was also historically known as the Millerian system, and the indices as Millerian,[although this is now rare.

The precise meaning of this notation depends upon a choice of lattice vectors for the crystal, as described below. Usually, three primitive lattice vectors are used. However, for cubic crystal systems, the cubic lattice vectors are used even when they are not primitive (e.g., as in body-centered and face-centered crystals).

참고

- 위키피디아