MUSEU NACIONAL DE HISTÓRIA NATURAL E DA CIÊNCIA
UNIVERSIDADE DE LISBOA
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QUARTZ AND STELLATE MICA

In the present Western cultures it is customary to associate this period of the year to the Star symbol. On the other hand, for the last 27 years the Museum has organised its Mineral, Gem and Fossil Show in December. Hence the choice of this piece to associate with December.

Micas (here **Muscovite**) and **Quartz** belong to the class of Silicates, that is, the set of minerals characterised by the presence of a basic unit of each silicon atom being surrounded by four oxygens in a tetrahedral arrangement: the centres of the oxygens occupy the positions of the vertices of a tetrahedron. This basic unit links to the remaining components in various ways, depending on the mineral under consideration.

Quartz is a **tectosilicate** because in it the silicon tetrahedra share the four oxygens with adjacent identical tetrahedra. In Quartz there results a helicoidal (screw) arrangement which, in projection, generates an hexagonal pattern (here illustrated for high temperature quartz, the simplest case). This explains the dominant habit of quartz, that of the hexagonal prism. The chemical composition of quartz is SiO_2, silica. The arrangement of the tetrahedra includes considerable empty space, hence the relatively low density of quartz (2,65) when compared with other minerals with the same composition (coesite, stishovite) formed under greater pressure. The hardness of quartz is elevated (7).

Muscovite is a **phyllosilicate** In these minerals the silica tetrahedrons are connected through sharing three oxygens in a two-dimensional arrangement (sheets). The sheets are superimposed on each other and connected by weaker bonds. This generates the well-known perfect cleavage. The chemical composition of muscovite is $KAl_2(AlSi_3O_{10})(OH)_2$ (hydrated aluminium and potassium silicate). The hardness of Muscovite is low (2 to 2,5).

In the exposed specimen Muscovite occurs with the stellate habit, resulting from twinning of 5 crystals with rhombic section (*Dana's New Mineralogy*, 1997).

The crystals exhibited here are fairly large. This results from the magmatic fluid transporting the chemical elements to be incorporated in quartz and muscovite having attained, at a certain stage of its path, conditions of temperature and pressure, as well as space and time, adequate for the development of the crystals.

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