

On some Crystals of "Lapis Lazuli"

A. Banerjee and T. Häger

Institut für Geowissenschaften, Edelsteinforschung,
Johannes-Gutenberg Universität Mainz, Mainz, Germany

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Some deep blue dodecahedral crystals from Afghanistan have been investigated by UV-, VIS- and IR-spectral photometry and x-ray powder diffraction technique. Contrary to earlier identification, the crystals have been identified as hauynite.

Due to its unique blue colour, lapis lazuli is used as an ornamental stone. Recently we obtained some dark blue 8 to 12 mm sized dodecahedral crystal from Afghanistan. Similar crystals have been described as crystals of lazurite [1]. The present investigation has been carried out in order to find the nature of these crystals.

The colour of massive lapis lazuli is caused by lazurite and hauyne [2]. As has been pointed out [3], there exist two types of massive lapis lazuli according to the dominance of hauyne or lazurite. Marked differences were found in the UV- and VIS-spectra of the two types:

The first type (hauyne type) shows two characteristic remission maxima at about 375 nm and 460 nm, in contrast to the second type (lazurite type), which shows only one remission maximum near 375 nm. According to their spectral features (remission maxima at 375 nm and 460 nm), the crystals under investigation belong to the hauyne type of lapis lazuli.

Two different IR-spectra have been published [4], which has led to some confusion. As is shown in Fig. 1 b, the hauyne type lapis lazuli differs from the lazurite type particularly by a characteristic absorption at 1149 cm^{-1} due to SO_4^{2-} , which is missing in the lazurite type lapis lazuli (Fig. 1 a). The IR-spectra of the crystals under investigation are identical with the IR-spectrum of hauyne type lapis lazuli (Figure 1 c).

The d -values, 2θ -values ($\text{CuK}\alpha$) and intensities of the present crystals have been compared with data for

the sodalite group minerals [5] and with those obtained by us by x-ray powder diffraction of some hauynes from the Eifel region (Germany). The x-ray data of the present crystals were found to be identical to the interferences of hauyne in [5] and to those of the hauynes investigated by us.

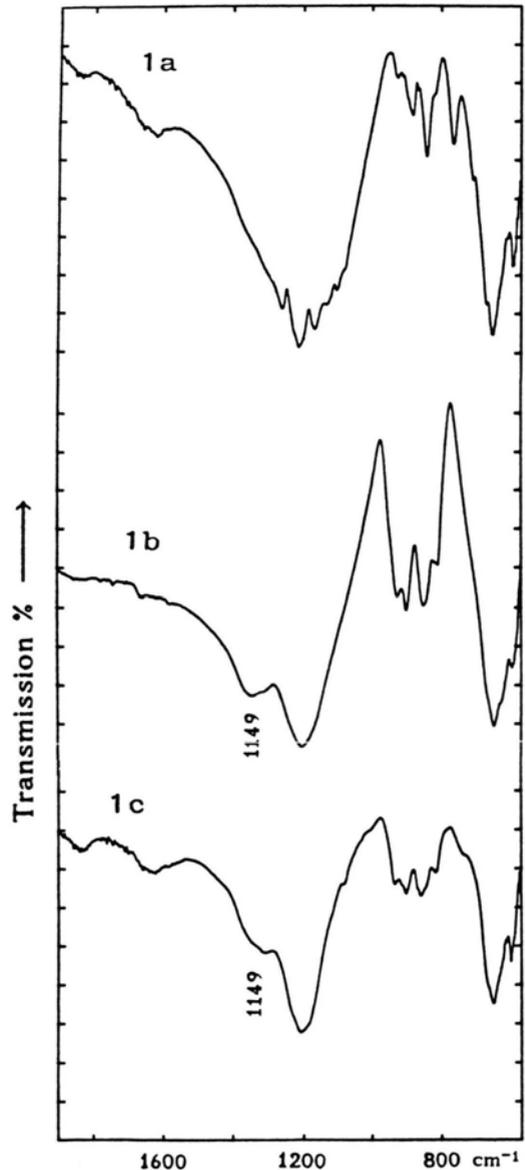


Fig. 1. a) IR-spectrum of lazurite type massive lapis lazuli; b) IR-spectrum of hauyne type massive lapis lazuli; c) IR-spectrum of investigated crystals.

Reprint requests to Dr. A. Banerjee, Institut für Geowissenschaften, Edelsteinforschung, Universität Mainz, D-6500 Mainz, Germany.

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Due to their similarity to hauyne (UV-, VIS- and IR-spectra together with x-ray data) it is concluded that the deep blue crystals from Afghanistan should be

called "hauynite" and not lazurite, as they have been called in the literature.

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