



Understand the mineralogy of jadeitites: natural and theoretical studies from a new occurrence of blue jade (Sorkhan area, Iran)

R. Bousquet (1), R. Oberhänsli (1), Mohssen Moazzen (2)

(1) Institut für Geowissenschaften, Universität Potsdam, Germany, (2) Department of Geology, University of Tabriz, Iran

The beauty and wide-ranging expression of jade have held a special attraction for mankind for thousands of years. Jade is, strictly speaking, a generic term for two different types of rocks, nephrite or jadeite, dominated either by amphibole or jadeite, respectively. Nephrites range mainly from medium to dark green or grey-green, but can also be white, yellowish or reddish. Rarer, somewhat harder, and therefore regarded as more precious, jadeitites display hues that include green, but also white or pink, and red, black, brown, violet, lavender and blue. In both rock types, the way the color is distributed varies considerably.

Jadeitites, and especially blue jadeitites, are rather uncommon rocks. Generally, they are associated with subduction-related serpentinites along fault zones (Harlow 2001) and generally interpreted as crystallizing from hydrous fluids derived from dehydration of subducted slabs at high P and T (Johnson & Harlow 1999). Truly blue and lavender jadeitites are reported from only a few localities around the world. Among the most renowned occurrences, some contain only one clinopyroxene (pure jadeite) as the Olmec blue jade (Quebrada Seca, Guatemala), the blue jade from Ohmi-Kotaki in Japan or the lavender jadeite from Tavsanlı in Western Anatolia, Turkey. Others as the green and bluish jadeites from Burma contain two clinopyroxenes (jadeite and omphacite).

We report here a new locality of clear, sky-blue jadeite occurring near Sorkhan, in a blueschist belt of southeastern Iran. Jadeite occur in a vein system along a ser-

pentinite – magnesite contact. The veins are composed of almost pure jadeite, 90 to 99.5 mol.% Jd, contain minor amounts of Ba-bearing K-feldspar, lawsonite and katophoritic amphibole.

The jadeitite veins formed at HP-LT conditions, around 1.6 GPa and 420°C. Thermodynamic studies show that the mineral assemblage within the blue jade is strongly pressure- and temperature-dependent. Jadeitites containing two clinopyroxenes (jadeite and omphacite) are stable at high pressure (0.8 GPa) and low temperature ($\leq 430^\circ\text{C}$) conditions, whereas blue jade with only one clinopyroxene (jadeite) forms at higher temperature or lower pressure. On the basis of these new calculations, P–T conditions of formation are re-examined for all occurrences of blue jade. From this study, we discuss the composition and the stability of one- and two-pyroxene-bearing jadeitites