Investigation of occurrences of high-quality quartz mineral resources in south-eastern Austria: First results from the Rittis quartzite

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In Austria, there is a high demand for high-quality quartz mineral resources, which, depending on the quality, are used in the glass, foundry or construction industries. The demand forecast indicates a continued upward trend for the next few years. Therefore, potential deposits of quartz sand, quartzite, pegmatite quartz and quartz from mobilisate layers are investigated in the frame of the project MRI_QUARTZ, supported by the “Initiative GBA Forschungspartnerschaften Mineralrohstoffe – MRI”. In this contribution, first results from the “Rittiser Quarzit” (Cornelius, 1952) are reported. It forms layers within orthogneiss (“Grobgneiss”) in the surrounding of the village Rittis/Krieglach (Styria). There, in the years 1860 to 1935 quartz of high-purity was mined from 16 sites, both in open pits and underground. In a raw material geological study by Erkan (1982) the quartz layers were interpreted as Permian-Lower Triassic metamorphic quartzite forming xenoliths within the orthogneiss. Geochemical investigations indicate an average purity of ~91 % SiO_2, whereas material from the dumps reached a SiO_2 content of up to 99 %. According to the recent nomenclature of the Geological Survey of Austria the Rittis quartzite appears within the Pretul orthogneiss, which is embedded in phyllonitic mica schists and paragneiss (“Hüllschiefer”). Together they form the Teufelstein Complex building up the Stuhleck-Kirchberg Nappe of the Koralpe-Wölz Nappe System (Austroalpine) (Matura & Schuster, 2014). The Pretul orthogneiss developed from biotite and locally two-mica granite with K-feldspar phenocrysts up to a few centimetres in size. LA-ICP-MS dating on zircons yielded Permian intrusion ages in the range of 250–285 Ma for different bodies of the widespread occurring lithology (Schuster et al., 2010; Yuan et al., 2021). For a sample from quarry Hadersdorf near to Rittis an age of 256 ± 8 Ma was determined. The gneissic texture developed during the Eo-Alpine tectonothermal overprint at greenschist facies conditions. Mapping revealed that the areas designated as Rittis quartzite in the published maps are not homogeneous bodies, but rather represent areas in which more or less pure quartz layers with up to 2 m in thickness occur within the orthogneiss. The latter Eoalpine deformation is expressed by a uniformly 20°–30° WNW dipping schistosity and top NW directed kinematics. The quartz layers are parallel to the schistosity, showing distinct contacts to the orthogneiss. They are homogeneous with no internal zoning or bedding, but single feldspar grains or lenses of orthogneiss may be embedded. Sometimes within the quartz a stretching lineation dipping shallowly (10°–15°) to the SW is developed. Often it is highly fractured or cataclastically deformed and rarely discordant quartz veins up to several centimetres in thickness are present. Due to the field observations, the Rittis quartzite is interpreted as quartz mobilisate layers formed during Eo-Alpine metamorphism. With geochemical and reserve investigations underway, the reserve potential is to be evaluated.