

Textural analysis of a microcrystalline quartz using X-Ray and Electron Backscatter Diffraction (EBSD) techniques

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We present the textural parameters of a microcrystalline quartz (average grain size 50 μm) obtained by X-Ray, neutron and EBSD. This unusual texture has been recognized in the investigation of pervasively silicified ore-bearing horizons occurring in the uppermost part of carbonate platform sequences of different ages (from Precambrian to Mesozoic) and of different geotectonic settings. This peculiar texture has been labeled “grid-work texture”, and derives only by a rather fast and preferred crystallization of quartz on the pre-existing morphological faces of other developed quartz crystals. After WIMV refinement of the ODF, the recalculated 001 pole figures, describe this grid-work texture by two orientation components: one at about 35° from the normal to the surface of the sample and a second having the c axes oriented at about 75° from the normal to the surface of the sample. Textural maps and parameters from EBSD and neutron investigations found very similar results highlighting as $30\text{-}40^\circ$ and $70\text{-}80^\circ$ misorientations are very common: moreover they allowed to establish that many of the quartz crystals are characterized by Dauphiné Twin boundaries.