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On the features of the Tatahouine meteorite

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A study of the Tatahouine diogenite compose by dark greenish brown orthopyroxene was done by scanning and transmission electron microscopies and Raman spectrometry. Prior to sample characterization, the Tatahouine diogenite was cleaned using a sonic bath by 20 min. The surface characterization and the chemical composition of the samples were performed with scanning electron microscopes in low-vacuum mode JSM-5600LV equipment with a Noran X-ray microanalysis detector, Voyager 4.2.3. The SEM analysis was performed at 20-25 kV acceleration voltage and at 20-25 Pa of pressure in the specimen chamber. SEM images were obtained with backscattered electrons. Micro-structural analysis was performed in a TEM JEM-2010F FASTEM with ultimate resolution point to point of 1.9 Å fitted with an energy dispersive X-ray spectrometer Noran, Voyager 4.2.3 and a Gatan Image Filter 200. High Resolution Transmission Electron Microscopy (HRTEM) and High Angle Annular Dark Field (HAADF) modes were employed. We observed several features as faults, dark velvet-like carpets, veins, orthorhombic bodies, rosettes and spider-like sections and all these features are rich in Fe, Si or Ca according with EDS spectra. The morphologies observed were also diverse.
From previous works the orthopyroxene features indicate shock effects in the Tatahouine meteorite. In this work a discussion about some possible mechanisms associated to the formation of all these features is presented.