PS08.02.01 Rietveld-refinements and temperature-dependent Moessbauer spectroscopic investigations of synthetic C2e clinopyroxenes.

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C2e clinopyroxenes on the hibonite join hedenbergite [Mg2Ca2Fe2Si3O12] - aegirine NaFe3Si2O6 were synthesized using standard hydrothermal techniques and investigated by means of temperature-dependent Moessbauer spectroscopy between 80 and 700 K, revealing Fe3+ and Fe2+ on the octahedral M1 position only and showing additional resonant absorption with hyperfine parameters intermediate between Fe3+ and Fe2+ above 250 K within the solid solution series, which gains intensity with increasing temperature. This is interpreted as thermally activated electron transfer between Fe2+ and Fe3+. Statistically occuring the M1 site. Syntheses were done at 4 kbar, 973 K and the redox conditions of the nickel/nickel oxide solid state buffer. Run products were characterized by microprobe analyses and XRF-diffraction including Rietveld refinements on selected samples in addition to Moessbauer spectroscopy. The dependence of lattice parameters on chemical composition deviates from linearity. Mean M1-O distances decrease with increasing acmite component, whereas mean M2-O and mean M-O distances show no significant variation. Within the M1-dig-zag chain, which is parallel to the crystallographic c-axis and consists of edge-sharing octahedra, the shortest Fe-Fe distance is 3.112(2) Å in hedenbergite and 3.196(2) Å in acmite. Room temperature Moessbauer spectra of the end-compositions show one narrow split doublet with hyperfine parameters characteristic for Fe2+ and Fe3+ respectively, whereas within the solid solution series the Fe3+ resonance absorption feature is broadened asymmetrically and can be refined into three doublets due to next nearest neighbour effects.

PS08.02.02 SPINEL FORMATION IN THE MESOSPHERE OF THE EARTH AFTER CRETAECOUS/TERTIARY IMPACT. S. Astarian, A. Preisinger and L. Petris, Institute of Mineralogy, Crystallography and Structural Chemistry, Tech. University of Vienna, A-1060 Vienna, Geiseidemarkt 9, AUSTRIA.

Magnetic spinels separated from hemipelagical and pelagic sediments of the Cretaceous/Tertiary (K/T) boundary sections of Bjala, Bulgaria and Cerbara, Italy were analysed by X-ray powder diffraction and by a scanning electron microscope equipped with microprobe. 65 million years ago Bjala was located at a distance of about 10000 km and Cerbara about 8000 km from the impact structure in Yucatan, Mexico. It is proposed, that the spinels found in the K/T boundaries are formed as re-condensed material of a hot fireball induced by the impact in the mesosphere of the Earth at an altitude of ~80-100 km.

The spinels were extracted with a strong magnet from a suspension of the K/T boundary clay. The spinels were crystallized as octahedra in the range of 1-20 μm in sizes. The magnetic minerals at both sites are principally nickel-rich (Ni>1%) managanese ferrite spinels with strong variation in the chromium content (0-10% Cr2O3). The octahedra from the K/T boundary sediment from Cerbara show a lower Cr content with lattice parameter of a=8.366 Å than those of the larger particles (3-20 μm) from Bjala with lattice parameter of a=8.364 Å. However the smaller particles (1-3 μm) from the latter site show low Cr content. The octahedral faces of the large particles of Bjala show etch pits. This etching could be a consequence of sulphuric acid rain following the K/T impact.