

Fig. S1: Raman spectra of Maj and Mgs from run MA-367 acquired on the polished section prepared for the microprobe investigations in comparison to a spectrum magnesite spectrum (X=50115) taken from the RRUFF database. They were measured with a Horiba Jobin-Yvon Labram HR 800 spectrometer (grating 1800 grooves/mm) in a backscattering configuration using a CCD detector, DPSS laser with 532 nm excitation line and an Olympus BXFM optical microscope. The spectrometer was calibrated using the Neon Plasma lines in this energy range. The numbers correspond to the peak positions. The Raman peaks of Mgs are shifted to lower wavenumbers compared to the spectrum of the endmember Magnesite of the database (RRUFF), which is in accordance to the incorporation of Fe in run MA-367. The peak position of the corresponding Raman bands of siderite are 182.1, 285, 1085.8 cm^{-1} (RRUFF ID 50349.1).

