Q06b Infrared absorption spectra of LIME olivine and its detection feasibility in observations

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From the view point of Solar abundance, common chemical composition of olivine in meteorites is expected as solid-solution between Mg_2SiO_4 and Fe_2SiO_4. The abundance of Mn is expected 2 orders less than those of Mg and Fe in the primitive solar nebular. However, Mn enriched but Fe depleted olivine and pyroxene were discovered in unequilibrated ordinary chondrites, IDPs (Interplanetary Dust Particles) (Klöck et al. 1989) and also *Stardust mission* samples from Comet 81/Wild2 (Zolensky et al. 2006). These silicates with peculiar chemistry are called LIME (*Low-Iron, Manganese-Enriched*) olivine and pyroxene. These LIME silicates may indicate a link between the origin and history of IDPs and the matrix materials of primitive meteorites. However, its origin and evolution processes are almost unknown, because reports on LIME silicates are scarcely in literature. In this work, we synthesized LIME olivine with wide chemical range of Mn-Mg solid-solution $(Mg_{1-x}Mn_x)_2SiO_4$, and measured Infrared absorption spectra between 8 and 100 μm and examined detection feasibility in observations.