Dust in the Mid-Infrared Source IRAS 15099-5856 with Prominent Crystalline Silicate Emission

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IRAS 15099-5856 is a remarkable mid-infrared (MIR) object embedded in the young supernova remnant (SNR) MSH15-52 at ~4 kpc. Seen only at >10um, IRAS 15099-5856 has a complex morphology with a bright central compact source (IRS1) surrounded by knots, spurs, and several extended (~4') arc-like filaments. In the previous study, the Spitzer MIR spectrum of IRS1 showed prominent Mg-rich crystalline silicate emission features and several ionic lines including strong [Ne II] 12.81um. It was suggested that IRS1 is heated by UV radiation from the nearby O star Muzzio 10 and that its crystalline silicates likely originate in a mass outflow from the progenitor of the SNR. The follow-up observations using a high-resolution MIR imager and spectrograph T-ReCS on Gemini-S we report here reveal extended and complex morphology of IRS1 in the [Ne II] 12.81um and Qa-band (18um) images. In both images, the source consists of two blobs which are centrally-brightened with local peaks, but the [Ne II] peaks are more compact (< 1'') and slightly shifted from the Qa-band structure. We present preliminary results of the T-ReCS observations and the CLOUDY modelling of the Spitzer spectrum. With various dust opacities including crystalline olivine ($Mg_{1.9}Fe_{0.1}SiO_4$) and FeO in calculations, we constrain dust properties such as abundance or temperature of IRS1 as well as the heating source and gas abundance. Based on the models, we discuss the possibility that the SNR MSH15-52 was an SN Ib/c exploded in a binary system.