

On FeO as a Carrier of the Mysterious “21 μ m” Emission Feature Seen in Protoplanetary Nebulae

J.M. Liu¹, B.W. Jiang^{1,2} & Aigen Li²

¹ *Beijing Normal University* ² *University of Missouri*

The mysterious "21 μ m" emission feature seen in fewer than two dozens carbon-rich protoplanetary nebulae remains unidentified since its discovery in 1989 (Kwok et al. 1989, ApJ, 345, L51). Peaking at 20.1 μ m, this feature is rather broad (with a FWHM of about 2.2-2.3 μ m) and accounts for up to 8% of the total infrared power of protoplanetary nebulae. In recent years nano-sized iron monoxide (FeO) dust has been proposed as a promising candidate material for this mysterious feature (Posch et al. 2004, ApJ, 616, 1167; Zhang et al. MNRAS, 396, 1247). We test the FeO hypothesis by modeling the stochastic heating of nano FeO grains by single stellar photons and calculate their infrared emission spectra in protoplanetary nebula environments. The spectral match between model predictions and astronomical observations, and the Fe and O abundances as well as the condensing dust species in carbon-rich environments are also discussed.