

Q14a A Broad 22 μm Emission Feature in the Carina Nebula HII Region

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We report the detection of a broad 22 μm emission feature in the Carina nebula HII region by observations with the Short Wavelength Spectrometer (SWS) on board the Infrared Space Observatory (ISO). The feature shape is found to be similar to that of the 22 μm emission feature observed in the Cassiopeia A supernova remnant, which has been attributed to newly synthesized dust grains of Mg protosilicate. The similarity suggests that both features originate from the same carrier and that supernovae are probably the dominant production source of this new dust component. A similar broad emission has been reported in M17 HII regions and is found also in the spectra of two starburst galaxies, M82 and NGC7582, from the ISO archival database. The new dust may be an abundant component of interstellar grains and can be used to trace the supernova rate or star formation rate in external galaxies. The existence of the broad 22 μm emission feature will complicate the dust model for starburst galaxies and must be taken into account correctly in the derivation of dust color temperature. It will also affect the source count of deep survey observations in the infrared region. The present results provide important information on the chemical composition and emission mechanism of the carrier.