

# Indication of organics in small areas of Ceres' surface: investigation in the Yalode crater

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Ceres is a dwarf planet in the main asteroid belt. In 2007, NASA launched the Dawn mission, which entered Ceres' orbit in 2015. The mission collected a vast amount of data by using Visible and Infrared Spectrometer (VIR). This data has made Ceres an intriguing target for astrobiological investigation, revealing carbon, minerals, salts and aliphatic organics. We can identify aliphatic organic matter by an absorption band around 3.4  $\mu\text{m}$  in IR spectra and a redder spectral slope in VNIR wavelengths. These elements can be found in a large region near Ernutet crater. The "Yalode region" was examined in this study because it was identified by previous research based on the camera data as a candidate area for hosting organic material. The objective of this study was to confirm the presence of aliphatic organics using a modeling approach to the VIR spectra, applying the Hapke theory. The spectra show deep bands at wavelengths of 3.4  $\mu\text{m}$  that could be due to carbonate and/or organics, making the identification of the organics particularly challenging. We inserted mixtures containing materials from the medium soil of Ceres plus organics from and into the model. The study found that the most accurate model involves a combination of semianthracite and medium anthraxolite as organic components. These organic materials are different from those previously used to interpret the intense absorption in the Ernutet crater. The study identified Fe-carbonate (siderite) as new mineral on Ceres' surface that can be used to model both global and localized regions.

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Sole e Sistema solare

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