High-albedo C-complex outer-belt asteroids: The near-infrared spectra

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Primitive, outer-belt asteroids are generally of low albedo, reflecting carbonaceous compositions like those of CI and CM meteorites. However, a few outer-belt asteroids having high albedos are known, suggesting the presence of unusually reflective surface minerals or, conceivably, even exposed water ice. Here, we present near-infrared (1.1–2.5 micron) spectra of four outer-belt C-complex asteroids with albedos > 0.1. We find no absorption features characteristic of water ice (near 1.5 and 2.0 micron) in the objects. Intimate mixture models set limits to the water ice by weight < 2 %. Asteroids (723) Hammonia and (936) Kunigunde are featureless and have (60–95 %) amorphous Mg pyroxenes that might explain the high albedos. Asteroid (1276) Ucclia also shows a featureless reflection spectrum with (50–60 %) amorphous Mg pyroxenes. Asteroid (1576) Fabiola shows a possible weak, broad absorption band (1.5–2.1 micron). The feature can be reproduced by either (80 %) amorphous Mg pyroxenes or orthopyroxene (crystalline silicate), being likely to cause its high albedo. We discuss the origin of high-albedo components in primitive asteroids.

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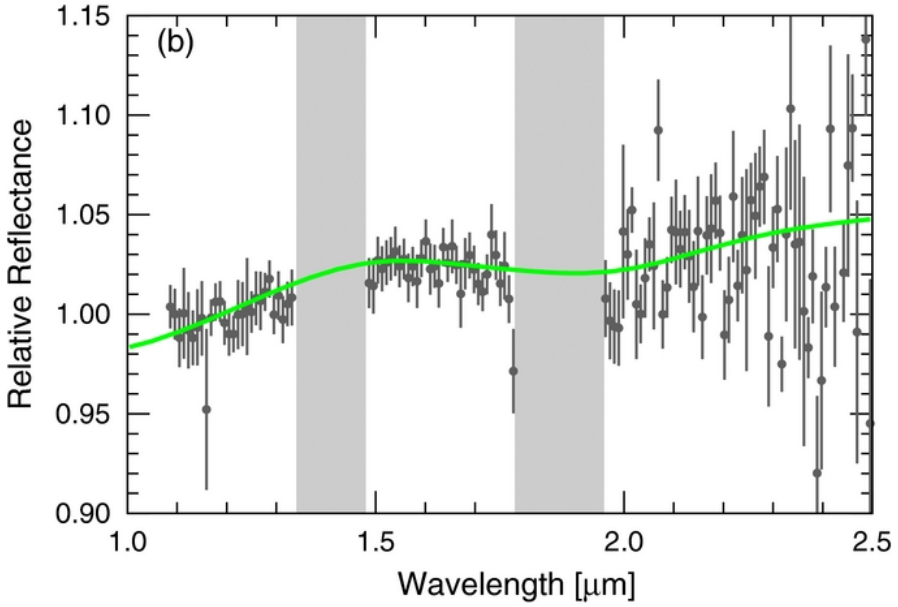

Figure: The reflection spectrum of asteroid (1576) Fabiola (black) and the model (green) using 0 % H_2O, 54 % AC, and 46 percent Opyx (orthopyroxene) by weight and grain size 3 micron.