

THE DIVERSITY OF HYDRATED MATERIAL ON LOW-ALBEDO ASTEROIDS

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Introduction: The low albedo asteroids are usually associated with the carbonaceous chondrites. They dominate the asteroid belt as a whole, with the C class (and subclasses) the most common spectral class in the middle to outer belt, and the D class prevalent in the Trojan asteroid region [1].

Water in the form of ice and bound into hydrated and hydroxylated minerals is strongly absorbing in the 3- μm spectral region. While water in the Earth's atmosphere makes this spectral region a more difficult one to work in than the visible and near-IR, decades of successful observations have been obtained [2-5]. These observations have mostly been made at the NASA IRTF on Mauna Kea, with the SpeX instrument the main workhorse during the 21st century [6].

Results: We have made over 100 observations of several dozen low albedo asteroids over the past several years, along with many higher-albedo objects. This survey has led to the identification of ice on the surface of 24 Themis [7] and the identification of brucite and carbonates on the surface of 1 Ceres [8,9]. It has also demonstrated the diversity of hydrated material in the asteroid belt, with spectral shapes ranging from CM-like to Ceres-like, and other yet-unidentified materials. There appear to be at least 4 plausible spectral classes, including one "anhydrous" group.

I will present the results of the survey so far, including an initial take at a taxonomy using survey data, implications of what we have found so far, and future directions.

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