

TWO NEW BASALTIC ASTEROIDS IN THE MAIN BELT? R.D. Duffard¹, and F. Roig².

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Introduction: The identification of basaltic asteroids in the asteroid Main Belt and the description of their surface mineralogy is necessary to understand the diversity in the collection of basaltic meteorites. Basaltic asteroids can be identified from their visible reflectance spectra and are classified as V-type in the usual taxonomies. In this work, we report visible spectroscopic observations of two candidate V-type asteroids, (7472) Kumakiri and (10537) 1991 RY16, located in the outer Main Belt ($a > 2.85$ UA). These candidate have been previously identified by [1] using the Sloan Digital Sky Survey colours. The spectroscopic observations have been obtained at the Calar Alto Observatory, Spain, during observational runs in November and December 2006.

The spectra of these two asteroids show the steep slope shortwards of $0.70 \mu\text{m}$ and the deep absorption feature longwards of $0.75 \mu\text{m}$ that are characteristic of V-type asteroids. However, the presence of a shallow but conspicuous absorption band around $0.65 \mu\text{m}$ opens some questions about the actual mineralogy of these two asteroids. Such band has never been observed before in basaltic asteroids with the intensity we detected it. We discuss the possibility for this shallow absorption feature to be caused by the presence of chromium on the asteroid surface.

Our results indicate that, together with (1459) Magnya, asteroids (7472) Kumakiri and (10537) 1991 RY16 may be the only traces of basaltic material found up to now in the outer Main Belt.

Observations: Low resolution spectroscopy of (7472) Kumakiri and (10537) 1991 RY16 were obtained on November 14, 2006, as part of a 4 nights observational run, using the Calar Alto Faint Object Spectrograph (CAFOS) at the 2.2m telescope in Calar Alto Observatory, Spain. The prime aim of the run was to characterize V-type asteroids inside and outside the Vesta family. Asteroid (7472) Kumakiri was observed again on December 29, 2006, using the same instrument and telescope, under Director's Discretionary Time (DDT).

Results and Discussion: The reflectance spectra of (7472) Kumakiri and (10537) 1991 RY16 are shown in Fig. 1. Both spectra show a steep slope shortwards of $0.70 \mu\text{m}$ and a deep absorption band longwards of $0.75 \mu\text{m}$. Using the algorithm of [2] we determine that the spectra can be classified as V-type.

The presence of a shallow absorption band in the spectra around $0.65 \mu\text{m}$ opens some questions about the actual mineralogy of these two asteroids. This band is likely to be related to the presence of Cr^{3+} cations, and provides evidence for a possible Cr-rich basaltic surface. The spectroscopic similarities among the two asteroids, together with some shared dynamical properties, point to the idea of a common origin from the break-up of a differentiated parent body in the outer belt. Further studies, including near infrared (NIR) spectroscopic observations, are mandatory to better address these issues. This work was presented in the Catastrophic Disruption Workshop, Alicante, 2007.

References: [1] Roig and Gil-Hutton (2006, *Icarus* 183, 411) [2] Bus, S.J. 1999, PhD Thesis, MIT.

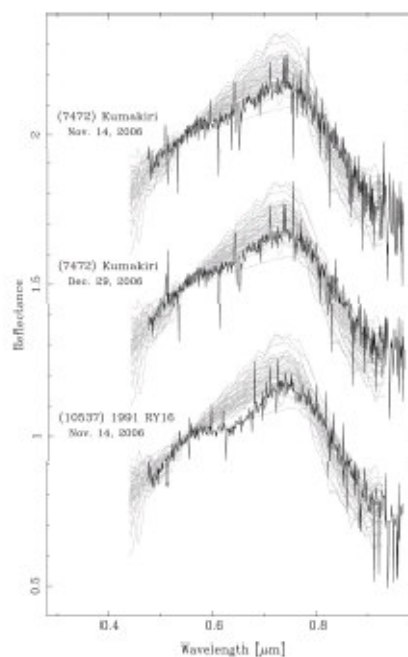


Fig. 1 Reflectance spectra of (7472) Kumakiri and (10537) 1991 RY16 (black lines) compared to the spectra of several known V-type asteroids taken from the SMASS and S3OS2 surveys (grey lines). The spectra are normalized to 1 at $0.55 \mu\text{m}$ and shifted by 0.5 units in reflectance for clarity. To remove the solar contribution, we have used the solar analog HD 191854 in the November 14 observations and the solar analog HD 28099 in the December 29 observation.