EPSC Abstracts,
Vol. 2, EPSC2007-A-00274, 2007
European Planetary Science Congress 2007

Reflectance spectra of two components of 21 Lutetia

V. Busarev

Sternberg Astronomical Institute (SAI), Moscow, Russian Federation (busarev@sai.msu.ru / Fax: 495-9328841)

We have obtained photometric [1] and spectral [2] indications that 21 Lutetia, a target of the ROSETTA space mission, is a binary object. We came to conclusions that Lutetia consists probably of a pair of similar in size bodies (40-50 km) orbiting around a common center of masses at a distance of ∼1000-km. Spectral observations of Lutetia on 4-8 November 2004 (with a spectrograph and ST-6 SBIG CCD mounted on the 1.25-m telescope of the SAI Crimean observatory) at extremely small aspect angle (∼43°) let us to obtain binary spectra of the asteroid and to extract corresponding spectra (in the 0.40-0.71 μm and 0.63-0.90 μm ranges) of the both components. We performed also calculations of the approximate reflectance spectra of Lutetia's components using 16 Cyg B as a solar analog star [3].

Analysis of Lutetia's component reflectance spectra showed that their shapes changed quickly (at ∼10-minute intervals) with rotation of the bodies and corresponded to those of C- or S- type asteroids at different moments. At the same time, Lutetia's integral reflectance spectrum (when it was observed) was similar to that of an M-type asteroid. In our opinion, it contradicts classification of Lutetia as a typical M-type asteroid. The primary and secondary may be conglomerates of very different materials (hydrated silicates, igneous silicates and/or metals). Probably, it is confirmed by identification of a 3-μm absorption band of bound water [4] and a 0.44-μm absorption band of serpentines [5, 6] in Lutetia's reflectance spectra. A possible interpretation of Lutetia's nature is that the asteroid might have been a subject of strong collision(s) with primitive body(es) in the past.

References: [1] Prokof'eva V. V., et al. (2006) *Sol. Sys. Res., 40,* 468-476. [2] Busarev V. V., et al. (2007) *Lunar and Planetary Sci. XXXVIII,* Abstract #1016. [3] Hardorp J. (1980) *A&A,* 91, 221-232. [4] Rivkin A. S., et al. (1995) *Icarus, 117,* 90-100. [5]

Busarev V. V., et al. (2004) *Vernadsky Inst.- Brown Univ. Microsimp. 40th*, Abstract #15. [6] Busarev V. V., et al. (2004), in *The new ROSETTA targets* /L. Colangeli, et al., eds., Kluwer Acad. Publishers, 79-83.