

Some properties of asteroids regolith : the case of Itokawa

F. Cipriani¹, V. Della Corte², N. Drozdovski¹, M. Accolla^{2,3}, M. Ferrari^{2,3}, D. Koschny¹, V. Mennella⁴, A. Rotundi^{2,3}, P. Vernazza⁵, L. Colangeli¹, O. Witasse¹

- (1) - ESA/ESTEC, Keplerlaan 1, 2200AG, Noordwijk, The Netherlands
- (2) - INAF-Istituto di Astrofisica e Planetologia Spaziali, Via Fosso del Cavaliere 100, 00133 Roma, Italy
- (3) - Dip. Scienze e Tecnologie, Università degli Studi di Napoli "Parthenope", Centro Direzionale I C4, 80143 Napoli, Italy
- (4) - INAF-Osservatorio Astronomico di Capodimonte, Via Moiariello 16, 80131 Napoli, Italy
- (5) - Laboratoire d'Astrophysique de Marseille, CNRS

The Hayabusa spacecraft collected submillimeter particles from the Muses Sea region on asteroid (25143) Itokawa on 19th and 25th of November 2005 [1,2]. Such particles are believed to retain original surface features of Itokawa's regolith, revealing imprints of the space environment as captured within the grains[3], which also exhibit asteroid-specific morphological properties. We report here preliminary results about:

1) morphological, chemical and mineralogical properties of returned samples, using Field Emission Scanning Electron Microscopy, Energy-Dispersive X-ray spectroscopy, Infra-Red micro-Spectroscopy, and X-Ray photoelectron spectroscopy.

2) surface charging properties of dust grains, determined within a low energy electron (10eV to 5keV) and UV environments.

Such analyses allow us to characterize the physical and chemical properties of the asteroid material and to improve in particular our understanding of airless bodies regolith charging and surface grains transport due to ambient electromagnetic field

References

[1] Fujiwara, A. et al, *Hayabusa Mission to Asteroid Itokawa: In-Situ Observation and Sample Return*, Dust in Planetary Systems, Proceedings of the conference held September 26-28, 2005 in Kaua'i, Hawaii. LPI Contribution No. 1280., p.50

[2] Yano, H. et al, 2006, Science, 312, 1350

[3] Nakamura et al, PNAS, Vol. 109, 11, 2012