



FORM PER PROGETTI BANDO DOTTORATO XXXIV CICLO

1. Project title

Diamonds in the Almahata Sitta meteorite

2. Proposer

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4. Key words

(Max. 5 – at least 2)

Diamond; ureilites; impact shock; X-ray diffraction; Raman spectroscopy.

5. Abstract

(Max. 1.500 characters with spaces)

Almahata Sitta (AHS) is the first meteorite originated from a known asteroid. In fact, its asteroidal parent body, the 2008 TC₃ asteroid, was discovered and tracked a few hours before it hit Earth. Moreover, as its photometric data and reflectance spectrum were collected, the Almahata Sitta is also the first meteorite observed to derive from a spectrally classified asteroid. The reflectance spectrum of 2008 TC₃ is close to the spectra of F-class asteroids, that are rare and, until the discovery of 2008 TC₃, were not considered as a source of meteorites. Past and ongoing studies on the Almahata Sitta fragments show a great lithological diversity, so that the meteorite is classified as a breccia. The samples contain at least 10 different lithologies of ureilitic rocks, enstatite, ordinary, carbonaceous and Rumuruti chondrites. Diamonds are commonly found in ureilites, but their origin is still unclear. In order to shed light on this unsolved problem, diamonds from various ureilitic fragments with different degree of shock from the Almahata Sitta meteorite will be characterised by means of Scanning Electron Microscope (SEM), X-ray micro-diffraction and micro-Raman spectroscopy.