

### MID-INFRARED SPECTRA OF ACHONDRITES: SEARCH FOR DIFFERENTIATED MATERIAL IN CIRCUMSTELLAR DUST.

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**Introduction:** Infrared observations of dust in the debris disks of evolving young stars give us the opportunity to infer the mineralogical composition of materials forming in those locations [e.g. 1]. Assuming that similar evolution of materials took place in other solar systems, differentiated bodies are expected to form in several million years after their birth. To find evidence of such material, we started a systematical mid- and far-infrared study of achondritic meteorites, of which the first results are presented here.

**Techniques:** Mass Absorption Coefficients were obtained from KBr pellets mixed with sample material in a wavelength range from 2.5 to 25  $\mu\text{m}$ .

**Results:** Millbillillie (eucrite) shows strong bands at 9.43, 10.37, 11.22, 15.91 and 19.87  $\mu\text{m}$ , reflecting the mixture of pyroxene and plagioclase. Another eucrite, Pasamonte, has generally similar, but much weaker features. Bilanga (diogenite) exhibits typical strong pyroxene bands at 9.43, 10.63, 11.45 and 19.87  $\mu\text{m}$ .

The olivine-rich ureilite Sahara 99201 shows the strongest bands at 9.97, 11.15 and 19.35  $\mu\text{m}$ , with weaker broad bands at 16.46 and 23.36  $\mu\text{m}$ . Dhofar125 (acapulcoite), which is dominated by pyroxene and olivine with minor feldspar, has features at 9.31, 9.93, 11.18 and 19.35  $\mu\text{m}$ . Pena Blanca Springs (aubrite), dominated by enstatite, plagioclase and olivine, has a complex spectrum with the strongest features at 9.28, 10.63, 11.65 and 19.28  $\mu\text{m}$ . Nova 003 (brachinite) shows typical olivine bands at 10.15, 11.27 and 19.72  $\mu\text{m}$ .

**Discussion:** The results of our measurements allow us to compare the IR spectra of the meteorites with those of astronomical objects. We found that the ureilite spectrum shows good similarity to the SPITZER spectra of dust material in the debris disk around the 16-my old star HD 113766 [2]. An earlier study did also show similarity of the spectrum of the Hajmah (a) ureilite to that of another young star, HD 179218 [4]. Ureilites show a wide range of shock effects of pressures up to 100 GPa [e.g. 3]. Thus, the spectral similarities would suggest that impact processing was taking place in the debris disk stage of those young stars. Nova 003 (brachinite) also shows good similarity to the same astronomical spectra except some shift in band position.

We also found that the spectra of Pasamonte (eucrite) and Dhofar 125 (acapulcoite) show some similarity to those of HR7012 [2] and HD104237, respectively. These young stars could also already be in the debris disk stage.

**References:** [1] Lisse et al. (2007) *The Astrophys. Jour.* 658, 584-592. [2] Chen et al. (2006) *The Astrophys. Jour. Suppl.* 166, 351-377. [3] Papike et al. (1999) *Planetary Materials*, pp. 4-83 [4] Morlok et al. (2006) *LPSC XXXVII*, abstract# 1519.

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