PROGRESS ON THE INFRARED SPECTROSCOPY OF DIAMONDOIDS AND THEIR ASTROPHYSICAL APPLICATION

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In the continuous effort for the unambiguous assignment of large carbonaceous species, we will present our recent laboratory observations concerning the infrared spectra of higher diamondoids (molecules consisting of diamond-like carbon cages) obtained by using various spectroscopic techniques. Increasing the size of the sample from adamantane ($C_{10}H_{16}$) to diamantane ($C_{14}H_{20}$), triamantane ($C_{18}H_{24}$), etc, corresponds to an addition of a cage C_4H_4 entity. Beyond its very interesting spectroscopic interest (due to the high symmetry of the systems studied here), this family of compounds which has been found in meteorites[a], also display a strong vibrational transition around 3.5 microns, thereby providing a convincing agreement with observed interstellar emission bands[b]. We will discuss in this communication the spectroscopic analysis of our different spectra as well as our search for the possible occurrence of these compounds in several astrophysical observations.

[a] E. Anders and E. Zinner, Meteorites 28 (1993) 490

[b] L. J. Allamandola, S.A. Sandford, A.G .G. M. Tielens, T. M. Herbst, Astrophysical Journal 399 (1992) 134