Spatially Resolved Analysis of Amines in Interplanetary Dust Particles using Fluorescent Molecular Probes. S. J. Clemett[1], S. Messenger[2], L. P. Keller[3], K. L. Thomas-Keprta[1], D. S. McKay[4]; [1]Lockheed Martin, 2400 NASA Road 1, Mail Code C-23, Houston, TX 77058; [2]Laboratory for Space Science, Washington University, St. Louis, MO 63130; NASA Johnson Space Center, Mail Code [3]SR/[4]SN Houston, Texas 77058.

Introduction: The presence of organic matter in interplanetary dust particles (IDPs) is of interest because: (1) some IDPs exhibit large isotopic excesses in deuterium (^2H) and/or ^{15}N thought to represent at least partial preservation of presolar organic matter [1,2]; and, (2) the abiotic organic evolution of early Earth and Mars may have been strongly influenced by dust accretion [3]. We report here the first observation of primary amines ($-NH_2$) in IDPs.

Concept: A fluorescent molecular probe is used to selectively tag a specific monofunctional organic group in an IDP thin section. The spatial distribution of the bound probe can then be determined using fluorescent microscopy. Subsequently samples can be imaged directly by transmission electron microscopy to determine mineralogical context.

Preliminary Results: Fluorescein-5-isothiocyanate (FITC) was used to tag primary amines. Derivatization was performed *in situ* by the addition of FITC dissolved in CH_3COCH_3 to an aqueous PO_4^{3-} buffer at pH 7.4 containing the sample. The distribution of primary amines in a thin section of the C-rich hydrated IDP L2005 J14 is illustrated in Figure 1, and is heterogeneous with three distinct hot spots.

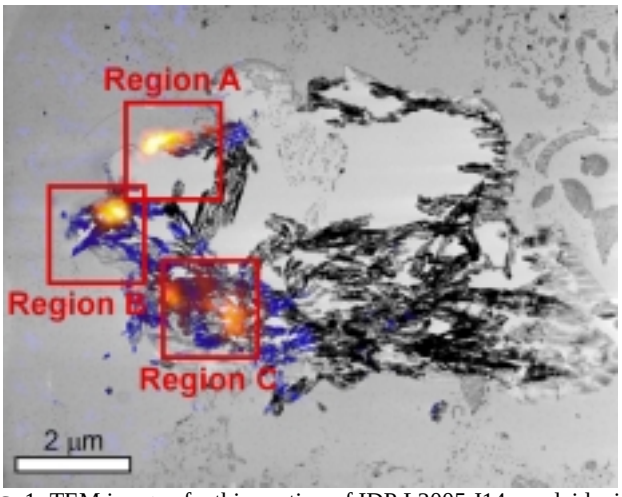

FIG. 1; TEM image of a thin section of IDP L2005 J14 overlaid with fluorescent image of $–NH_2$ distribution using FITC.

Regions 1 & 2 are composed of nanometer sized magnetite (Fe_3O_4) grains intimately associated with and/or mantled in carbonaceous material, while Region 3 is composed primarily of vesicular carbonaceous material with associated phyllosilicates. Quantification of abundances has not been established but the amine concentration in the hot spots is estimated to be in the part per thousand to part per million range. These results suggest the use of fluorescent molecular probes, used primarily by the microbiology community, may have wider applicability to the fields of cosmochemistry and astrobiology.

References: [1] Messenger, S. & Walker, R.M. (1996*) AIP Conf. Proc.* **402**, 545; [2] Keller, L. P., et al. (1997) *LPS*C **XXVIII**, 707; [3] Anders, E. (1989) *Nature* 342, 255