

MINERALOGY AND PETROLOGY OF COMET WILD2 NUCLEUS SAMPLES — FINAL RESULTS OF THE PRELIMINARY EXAMINATION TEAM.

Stardust Mineralogy/Petrology Subteam: Michael Zolensky¹, Phil Bland², John Bradley³, Adrian Brearley⁴, Sean Brennan⁵, John Bridges⁶, Donald Brownlee⁷, Anna Butterworth⁸, Zurong Dai³, Denton Ebel⁹, Matt Genge², Matthieu Gounelle¹⁰, Giles Graham³, Jeff Grossman²⁸, Lawrence Grossman¹¹, Ralph Harvey¹², Hope Ishii³, Anton Kearsley¹³, Lindsay Keller¹, Alexander Krot¹⁴, Falko Langenhorst²⁷, Antonio Lanzirotti¹⁵, Hugues Leroux¹⁶, Graciela Matrajt⁷, Keiko Messenger¹, Takashi Mikouchi¹⁷, Tomoki Nakamura¹⁸, Kazumasa Ohsumi¹⁹, Kyoko Okudaira²⁰, Murielle Perronnet¹, Frans Rietmeijer⁴, Steven Simon¹¹, Thomas Stephan²¹, Rhonda Stroud²², Mitra Taheri²², Kazu Tomeoka²³, Alice Toppani³, Peter Tsou²⁴, Akira Tsuchiyama²⁵, Michael Velbel²⁹, Iris Weber²¹, Mike Weisberg²⁶, Andrew Westphal⁸, Hajime Yano²⁰, Thomas Zega²². ¹NASA JSC (email: michael.e.zolensky@nasa.gov), ²Imperial College, ³Lawrence Livermore National Lab., ⁴Univ. New Mexico, ⁵SLAC, ⁶Open Univ., ⁷Univ. Washington, ⁸Univ. California, Berkeley, ⁹American Museum of Natural History, ¹⁰Muséum National D'Histoire Naturelle, ¹¹Univ. Chicago, ¹²Case Western Reserve Univ., ¹³Natural History Museum, ¹⁴Univ. Hawaii, ¹⁵Brookhaven National Lab, ¹⁶Univ. Sciences et Technologies de Lille, ¹⁷Univ. Tokyo, ¹⁸Kyushu Univ., ¹⁹Inst. Materials Structure Science-KEK, ²⁰JAXA-ISAS, ²¹Univ. Münster, ²²Naval Research Lab., ²³Kobe University, ²⁴JPL, ²⁵Osaka Univ., ²⁶Kingsborough Community College, ²⁷Inst. für Geowissenschaften, ²⁸US Geol. Survey, ²⁹Michigan State Univ.

Introduction: The sample return capsule of the Stardust spacecraft was successfully recovered in northern Utah on January 15, 2006, and its cargo of coma grains from Comet Wild 2 has now been the subject of intense investigation. This presentation will present the “final” results from the mineralogical and petrological analyses that will have been performed.

Mineralogy/Petrology: Although one month does not appear to be much time, it has been sufficient to permit numerous analyses (E-beam, Synchrotron XRD, spectroscopy, etc) to have been performed to permit some understanding of the following fundamental sample issues:

- (1) Comet nucleus mineralogy and petrology, and grain physical properties
- (2) Sample variability
- (3) Type and degree of sample alteration by the collection process, and subsequent sample handling
- (4) Sample documentation and handling procedures
- (5) Comparisons to what was reported by the Deep Impact Mission to Comet Temple 1

Future of the Samples: Following the close of sample preliminary examination, Stardust samples will be made available to the larger community as are lunar samples, IDPs, and Antarctic meteorites. A sample “catalog” will be available at the JSC Curation website (<http://curator.jsc.nasa.gov/stardust/index.cfm>). A dedicated peer review committee will consider all sample requests. The Stardust interstellar tray is being scanned in the Cosmic Dust Lab; when this operation is complete (~Christmas 2006) the Cosmic Dust Lab will be reopened for business.