



Stardust Surprise—Comet Dust Is Mixed and Varied (图)

<http://www.fristlight.cn> 2006-12-15

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[摘要] 14 December 2006. Microscopic grains collected by a U.S. probe indicate that comets are composed of a wide range of minerals of vastly different origins mixed together, according to a special section on the Stardust Discovery Mission in the 15 December issue of Science.

[关键词] Stardust; Comet; solar system; mineralogy and petrology



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The conclusion, which represents the first published research from the examination of the Wild 2 comet, overturns previous hypotheses by showing that materials close to the Sun have traveled to the outermost regions of the solar system.

"As the solar system formed 4.6 billion years ago, material moved from the innermost part to the outermost part. I think of it as the solar system partially turning itself inside out," said lead author Donald Brownlee, professor of astronomy at the University of Arizona and colleagues, along with Brooks Hanson, physical sciences deputy editor at Science, participated in a 14 December press conference at the American Geophysical Union Fall Meeting in San Francisco, Calif.

Launched in February 1999, the Stardust probe captured dust from Wild 2's tail in 2004 just outside Mars' orbit. Scientists devised a new technique of capturing the dust in a panel of neutral gel as it passed perhaps as close as 150 miles from the comet.

The scientists estimate that around 10% of the materials studied came from the inner solar system. "That's a real surprise because the common expectation was that comets would be made of interstellar dust and ice," said Brownlee.

Other interesting finds from the inner solar system included grains of magnesium olivine, a component of green sand found on some Hawaiian beaches.

Scientists estimate that the comet formed more than 4.5 billion years ago.

The Stardust special section covers a range of topics including the isotopic composition, the organics captured, the findings from infrared spectroscopy, elemental composition, mineralogy and petrology, and the effects of the stardust entering the collection

