

Space Station Crew Answers Question about Micrometeorites

Cosmochemists know space is not exactly empty. In fact, it's the solid material they seek to analyze: meteorites, asteroids, the Moon, planets, interplanetary dust particles, and stardust just to name a few. So when the astronauts on the International Space Station held a briefing on May 26, 2012 after the successful berthing and opening of the hatch to the SpaceX/Dragon capsule, **PSRD's** Linda Martel



Expedition 31 Flight Engineers (left to right) Don Pettit, Andre Kuipers, and Joe Acaba discuss SpaceX/Dragon's mission during May 26, 2012 news conference from inside the Dragon spacecraft. Photo credit: NASA TV.

joined the Q&A to ask them more about the space environment, specifically micrometeorites.

Expedition 30/31 flight engineer Don Pettit had inspected the outside of the Dragon capsule with binoculars the previous day and reported no micrometeorite damage. Martel asked Pettit to describe what micrometeorite damage would look like and if he had seen it, how that would have changed the procedures for berthing or hatch opening.

Pettit's answer, in summary, was when micrometeorites impact the aluminum structure they make little craters, a millimeter or two in diameter, that have sharp edges. If the tiny pits are on mating surfaces for pressure seals, they can prevent a good seal. From inside the Space Station, Pettit used binoculars to inspect the mating surfaces on the Dragon capsule that would

be mating to the bottom flange surface of Node 2 to create the pressure seal between the inside of Dragon and the inside of the Space Station, thus keeping Space Station air from leaking out into space. No micrometeorite bombardment is good news for spacecraft and astronauts.

Micrometeorites are a fact of life. On airless bodies, their barrage causes *space weathering*. On Earth, micrometeorite bombardment accounts for almost 30,000 tons of material entering our atmosphere each year. Though most of the material evaporates during entry or is lost to sea or falls unnoticed, thousands of micrometeorites have been collected successfully from deep-sea sediments and from the snow and ice of Earth's polar caps. Analyzing these tiny particles helps cosmochemists better understand our Solar System's building blocks. See these **PSRD** articles to read more about the science of micrometeorites and micrometeorite bombardment:

- [***Cosmochemistry and Human Exploration***](#)
- [***Melted Crumbs from Asteroid Vesta***](#)
- [***The Composition of Asteroid 433 Eros***](#)
- [***Samples from Asteroid Itokawa***](#)
- [***New Mineral Proves an Old Idea about Space Weathering***](#)

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