
EAPS Planetary Lunch Colloquium Series (PICS)

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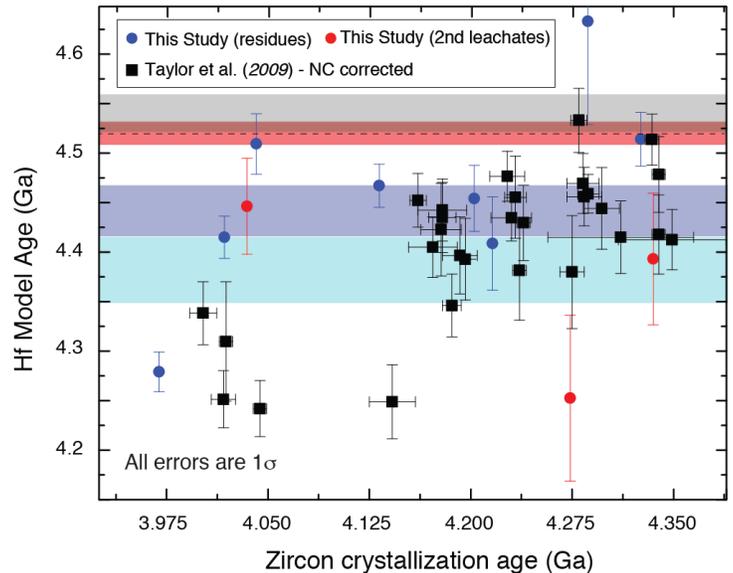
Tuesday, November 8th

12:30pm

54-517

The Age of the Moon

Establishing the age of the Moon is critical to understanding solar system evolution and the formation of rocky planets—including Earth. However, despite its importance, the age of the Moon has never been accurately determined. Here we present uranium-lead dating of Apollo 14 zircon fragments that yield highly precise, concordant ages demonstrating that they are robust against post-crystallization isotopic disturbances. Hafnium isotopic analyses of the same fragments show extremely low initial $^{176}\text{Hf}/^{177}\text{Hf}$ ratios corrected for cosmic ray exposure that are near the solar system initial value. Our data indicate differentiation of the lunar crust by 4.51 Ga, requiring formation of the Moon within the first ~ 60 million years after the birth of the solar system.



- Upper-limit from $^{182}\text{Hf}-^{182}\text{W} = 4.52$ Ga
- Indirect dating of the GI/Moon
 - Collateral damage in the asteroid belt (4.45-4.47 Ga)
 - HFSE on Earth during accretion (4.47 Ga)
 - Pb isotopes in BSE (4.42-4.43 Ga)
- This study (Lu-Hf zircon) 4.51 ± 0.01 Ga**
- Direct dating of LMO products
 - Sm/Nd and Rb/Sr on FAN's (4.35-4.41 Ga)
 - Pb isotopes of lunar basalts (4.376 Ga)

For more information, contact John Biersteker (jo22395@mit.edu)