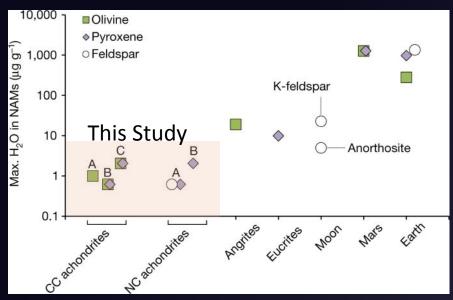
Planetary differentiation causes almost complete degassing of water





- A team of researchers set out to answer the question: "Which type(s) of bodies in the early solar system contained water?"
- The team utilized secondary ion mass spectrometry (SIMS) to measure the **lowest ever recorded** water concentrations in meteorites.
- These results demonstrate that regardless of how much water a planetary body has initially, differentiation into a core and a silicate mantle (i.e. melting) will cause almost quantitative loss of water through degassing due to the high temperatures involved. Once planets reach a radius of >1000km they have sufficient gravitational force to retain an atmosphere and, thereby, water.
- This study suggests that the addition of water to the terrestrial planets (Mercury, Venus, Earth, Mars) could not have occurred while they were smaller than 1000km in radius.

Newcombe et al. (2023) *Nature*