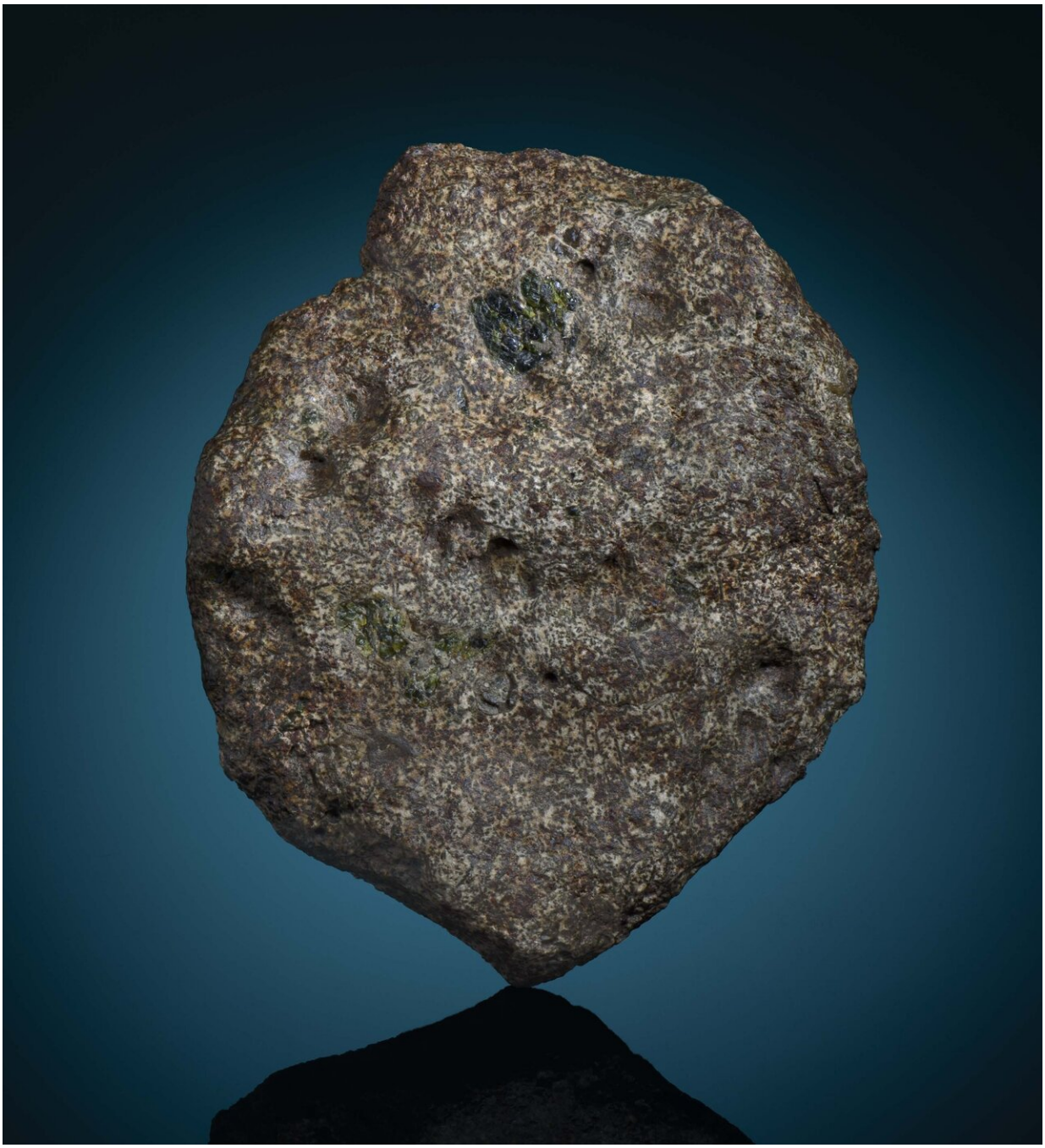
Achondrite found to date back to just two million years after birth of solar system

March 9 2021, by Bob Yirka



A piece of the EC 002 meteorite. The main mass of the meteorite resides at the Maine Mineral & Gem Museum. Credit: Maine Mineral and Gem Museum/Darryl Pitt.

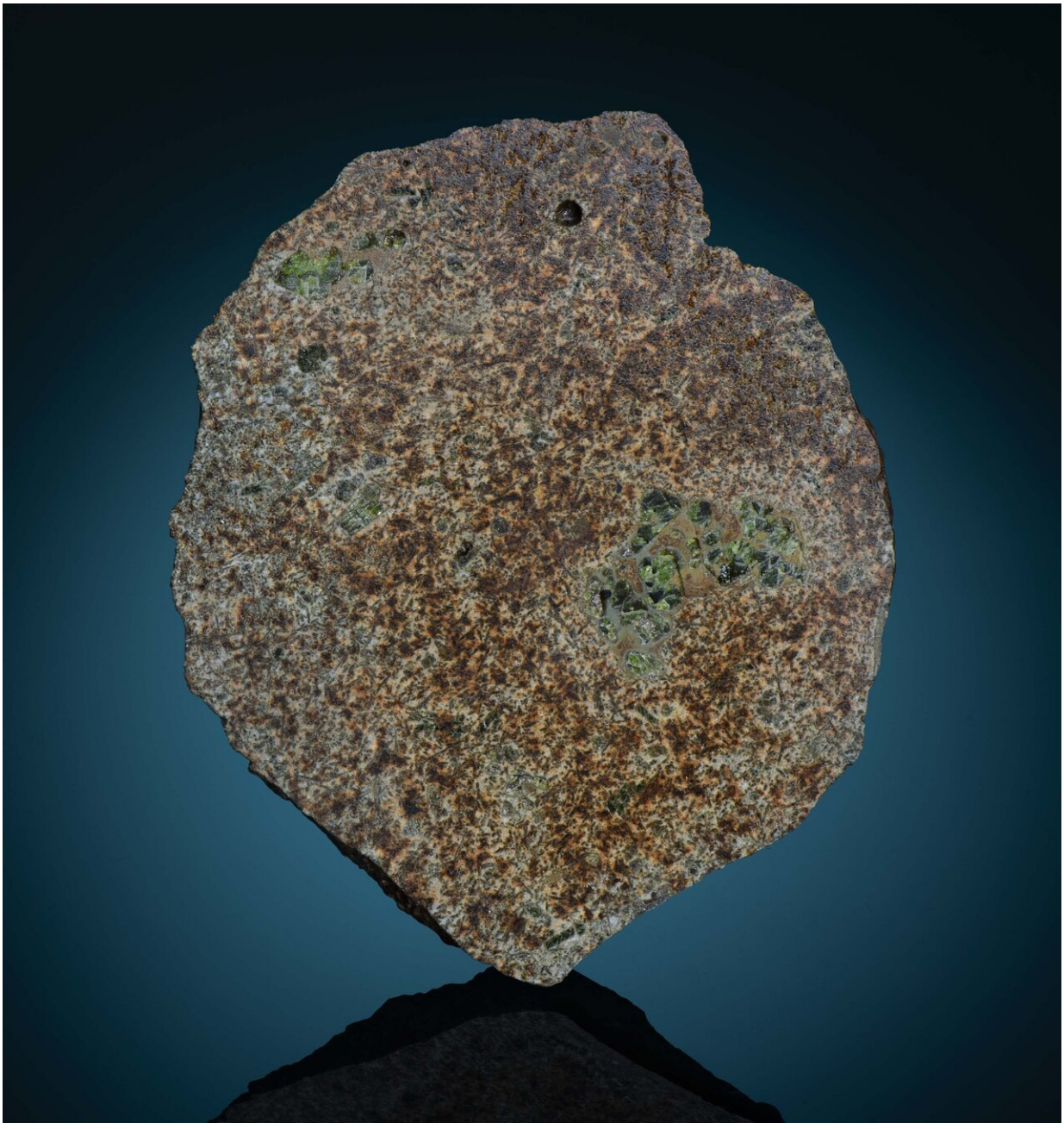
A team of researchers affiliated with several institutions in France and one in Japan has found that an achondrite found in Algeria (in the Saharan desert) last year dates back to just 2 million years after the birth of the solar system. In their paper published in *Proceedings of the National Academy of Sciences*, the group describes their study of the rock and what they learned about it.

Achondrites are types of meteorites that were once part of a protoplanet. To reach Earth, the planet to which they once belonged would have been shattered during a collision with another body. To date, only a few thousand achondrites have been found and studied, most of which are basaltic. The new achondrite, named EC 002, is different. The researchers with this new effort found that it was made mostly of volcanic rock, which makes it an andesite—a rock rich in sodium, iron and magnesium. On Earth, andesite is generally found in subduction areas, which suggests EC 002 came from the crust of a very early protoplanet. Dating of the rock showed it to be approximately 4.6 billion years old, predating Earth. The researchers determined its age by studying its magnesium and aluminum isotopes.

Additional study of the rock showed that it took approximately 100,000 years to cool and solidify. The researchers also found nothing to distinguish the achondrite from others of its kind, suggesting that such materials were likely common in protoplanets in the early solar system. The sample itself, however, is considered to be a very rare find—no other sample like it has been found on Earth. It is also the oldest magnetic rock ever observed. The researchers describe it as "relatively coarse grained, tan and beige," noting that it was also spotted with yellow and green bits. They also note that when they looked at other celestial bodies, focusing on their wavelengths, they found nothing that matched the wavelength reflected by EC 002.

The researchers suggest more study of the achondrite could lead to a

better understanding of how planets form.



A piece of the EC 002 meteorite. The main mass of the meteorite resides at the Maine Mineral & Gem Museum. Credit: Maine Mineral and Gem Museum/Darryl Pitt.

More information: Jean-Alix Barrat et al. A 4,565-My-old andesite from an extinct chondritic protoplanet, *Proceedings of the National Academy of Sciences* (2021). DOI: 10.1073/pnas.2026129118