

P/T Boundary and C₆₀ Fullerenes - A Materials Science Perspective -

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The P/T boundary is a cutting-edge topic not only in earth science but in nanoscience and materials science, ever since "C₆₀ fullerene" was discovered in P/T boundary sections in the Inuyama area, central Japan in 1999. Since the formation of C₆₀ fullerene molecules could only be achieved under somewhat restricted conditions such as imperfect combustion of unsaturated hydrocarbons, the founding of C₆₀ molecules in any geological sections suggests the occurrence, for example, of an anoxia triggered by wildfires. In fact, at the time of the C₆₀ discovery in the Inuyama's P/T sections, we hypothesized that the C₆₀ molecules were likely synthesized within locally anoxic zone in the extensive wildfires on the supercontinent Pangea and deposited on an anoxic deep-sea floor of the superocean Panthalassa.

Here, we report the discovery of C₆₀ fullerene in Ubara P/T boundary sections in Hyogo Prefecture. Surprisingly, the amount of C₆₀ found in these sections is more than two orders of magnitude larger than those found in the Inuyama P/T boundary. The presence of such a huge amount of C₆₀ fullerene in the Ubara P/T boundary could not reasonably be explained only by the extensive wildfires.

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