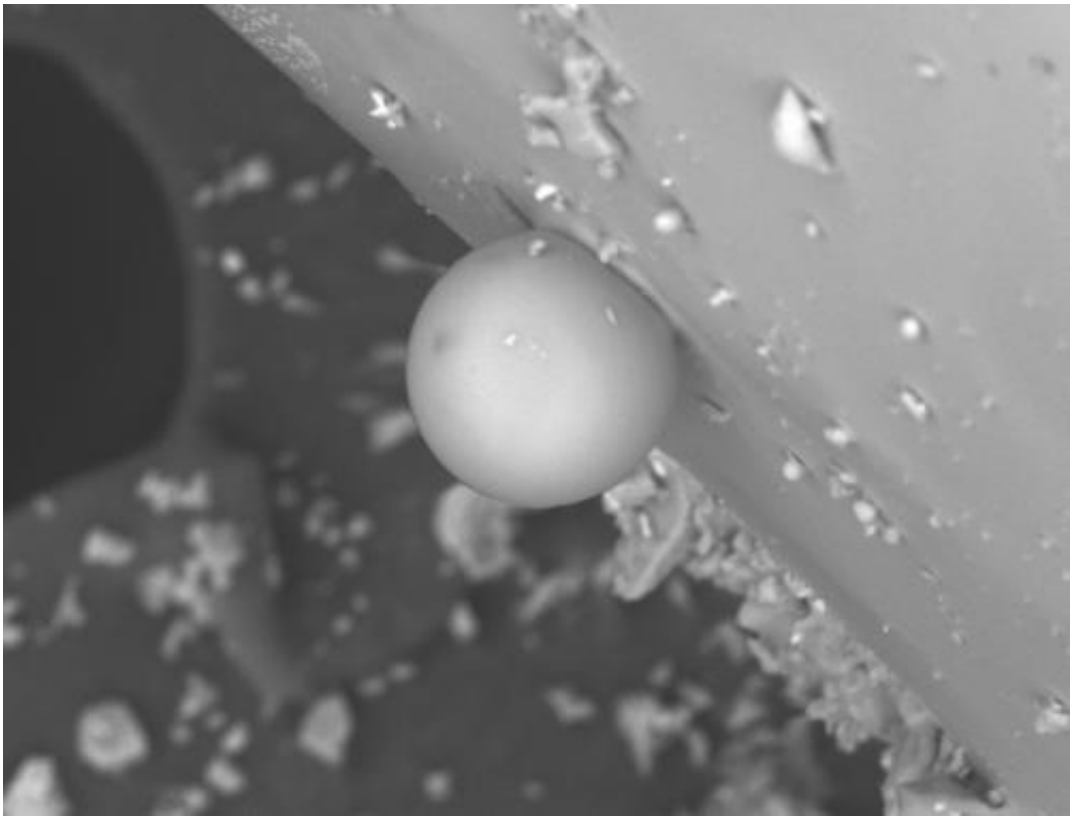
Lightning plus volcanic ash make glass

March 3 2015



Secondary electron image showing a glass spherule formed in high-voltage flashover experiments to examine the effect of ash contamination on electrical insulators. Photo by Kimberly Genareau. Credit: Kimberly Genareau, Genareau et al., *Geology*, Geological Society of America.

In their open-access paper for *Geology*, Kimberly Genareau and colleagues propose, for the first time, a mechanism for the generation of glass spherules in geologic deposits through the occurrence of volcanic

lightning. The existence of fulgurites—glassy products formed in rocks and sediments struck by cloud-to-ground lightning—provide direct evidence that geologic materials can be melted via natural lightning occurrence.

Lightning-induced volcanic spherules (LIVS) form in the atmosphere from the physical transformation of volcanic ash particles into spheres of glass due to the high heat generated by lightning discharge. Examples of these textures were discovered in deposits from two volcanic eruptions where lightning was extensively documented: The 23 March 2009 eruption of Mount Redoubt, Alaska, USA, and the April-May 2010 eruption of Eyjafjallajökull, Iceland.

In some cases, the individual spherules are smooth, while in other instances the surfaces are interrupted by holes or cracks that appear to result from outward expansion of the spherule interior. Analogue laboratory experiments, examining the flashover mechanism across high voltage insulators contaminated by volcanic ash, confirm that glass spherules can be formed from the high heat generated by electrical discharge.

More information: Lightning-induced volcanic spherules, Kimberly Genareau et al., University of Alabama, Tuscaloosa, Alabama, USA. Published online ahead of print on 27 Feb. 2015; http://dx.doi.org/10.1130/G36255.1. This article is OPEN ACCESS online.

Provided by Geological Society of America