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Characterizing impact generated platinum-group element alloys from Archean spherule layers.

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Archean spherule layers (SL) in the Barberton Greenstone Belt (BGB) are amongst the oldest known impact deposits on Earth. Spherules could be molten impact ejecta and condensation products from impact plumes or crater ejecta melted during atmospheric reentry. Barberton SL were originally identified by their excessive PGE contents. The search for phases hosting this extraterrestrial PGE signature lead to discovery of sub- μm PGE phases, whose formation is still controversial. Primary particles from the projectile, product of impact melting, or condensation in the plume have been proposed as origin of these alloys. Resolving this requires detailed multidisciplinary analysis to characterize the nature of these PGE phases. We report results of a compositional low voltage FE-SEM/EDX study, a STEM/EDX study and transmission Kikuchi diffraction (TKD) analysis of sub- μm platinum group-metal (PGM) phases, all hosted by Ni-Cr spinel. In addition, first results of a Ru and Mo isotopic study of Archean SL samples will be presented.

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