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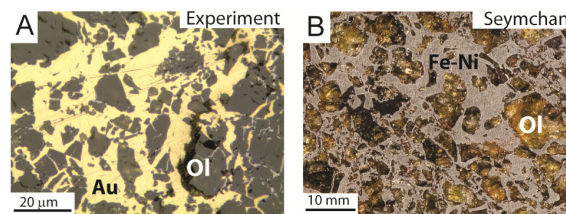
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Two-stage formation of angular pallasites revealed by novel deformation experiments

Walte*, N.P., Solferino, G.F.D., et al.

*Heinz Maier-Leibnitz Zentrum, TU München, 85747 Garching, Germany, nicolas.walte@frm2.tum.de.

Pallasite formation is controversial, either sampling the core-mantle boundary or the shallower mantle of planetesimals that suffered an impact. To test the impact model, we performed high strain-rate deformation experiments with the analogue system olivine – FeS/Au melt. All major textures of angular pallasites, including olivine – metal mush zones and olivine clusters could be experimentally reproduced (Fig. 1). Our results suggest that angular pallasites preserve evidence for a two-stage formation process, including inefficient core-mantle differentiation and an impact causing disruption, core melt injection, and fast cooling. Olivine clusters are reinterpreted as mantle remnants containing primordial metallic melt pockets not stemming from the impactor.



+ Fig. 1. Olivine–metal mush in experiment and nature +

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