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DIFFERENTIATION OF Fe-Ni SPHERULES IN IMPACT GLASS

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Metallic, micron sized Fe-Ni spherules are frequently reported from glasses formed during impact processes. They have a high preservation potential and are a valid indicator of impactor type.

However, the details of their formation remain obscure and their potential as specific indicator of impact details unexploited.

In this work on the impact glass from Wabar we report on of the relation between the simple spherules themselves and the hosting glass using SEM, and a detailed study of the spherules using a combination of FIB/SEM reconstruction and TEM.

Overall, we identified a late stage differential contraction of the spherules in the hosting glass, facilitating mechanical separation of the spherules from the host. The structure of the spherules is consistent with entry of a small nugget of the meteorite and some associated air into the molten glass. The spherical shape is acquired as the molten glass induces melting of the metal and its minor components. While the metal is molten a density related differentiation of the light components like iron sulfide and voids results in the accumulation of these at or close to the surface of the spheres.

With these principal processes being established the huge variation in the detailed sphere morphology can be rationalized.

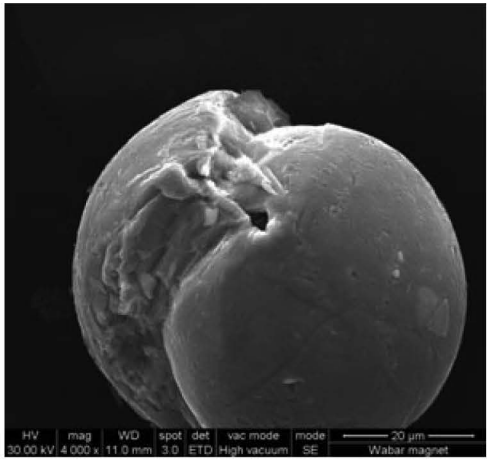

Fig. 1. Composite Fe-Ni spherule from Wabar impactite glass.