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Abstract: Results obtained from ground-based reference experiments, a parabolic flight campaign (PFC) and the sounding rocket MASER 11 campaign are presented. X-ray analysis that allows us to follow the entire foaming process in-situ, was employed for qualitative and quantitative analysis of local changes in density, pore size distribution and the frequency and location of cell wall rupture. In the PFC, we found that under microgravity imbibition of liquid metal into the foam due to capillarity forces dominates, and even a pre-existing gravity-induced drainage disappears. This effect could be observed specially after gravity transitions from 1.8 to 0 g. During MASER 11, a homogeneous wet collapse-free metal foam with round pores could be produced. Obviously, there was no gravity-induced drainage, but an unexpected strong coalescence rate was observed. We conclude that gravity-induced drainage is not the only factor that leads to cell wall rupture as previously assumed.

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