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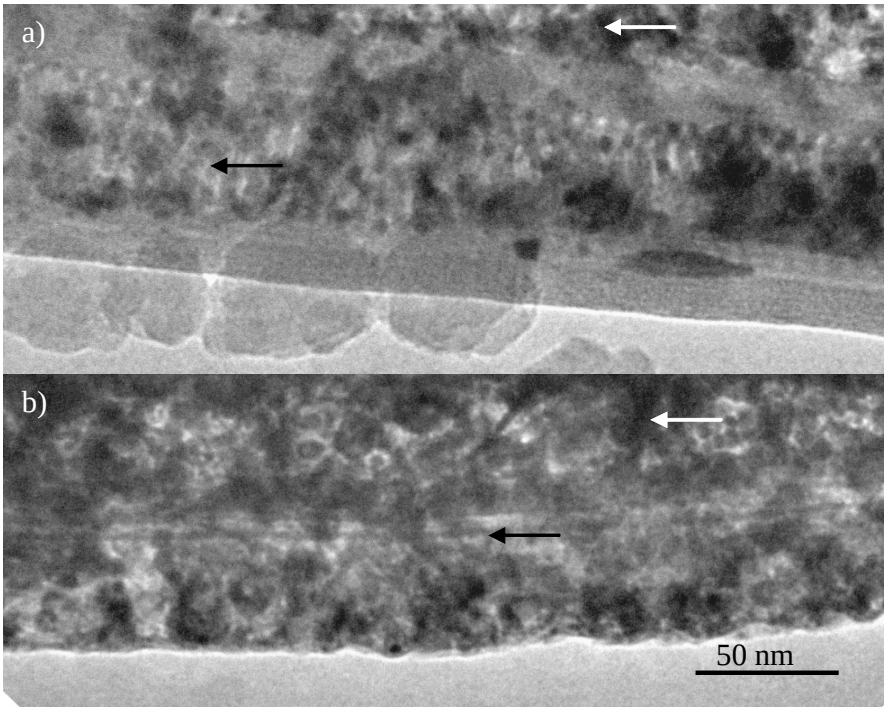

Figure S1. TEM images of mesostructured filaments a) “circular” and b) “columnar” with included Ge nanostructures prepared by supercritical fluid deposition after dissolving the alumina matrix.

The supercritical fluid deposition process proceeds with zero surface tension allowing efficient and fast mass transport of Ge into the mesopores. TEM analysis of the isolated mesostructured filaments show that they are almost 100 % filled with Ge nanostructures (shown with black arrows) and covered with copious amounts of Ge deposits on their outer surface (shown with white arrows). Since the non-calcined mesostructured filaments were encapsulated in the channels of the AAMs during the deposition, the outer surface coverage can be explained by cleavage of the mesoporous silica filaments from surface of the AAMs during the deposition process.