Electronic Supplementary Material (ESI) for CrystEngComm

Unconventional vapor – liquid – solid mechanism of ultralong $Ba_6Mn_{24}O_{48}$ whiskers growth from chloride fluxes

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Supporting information

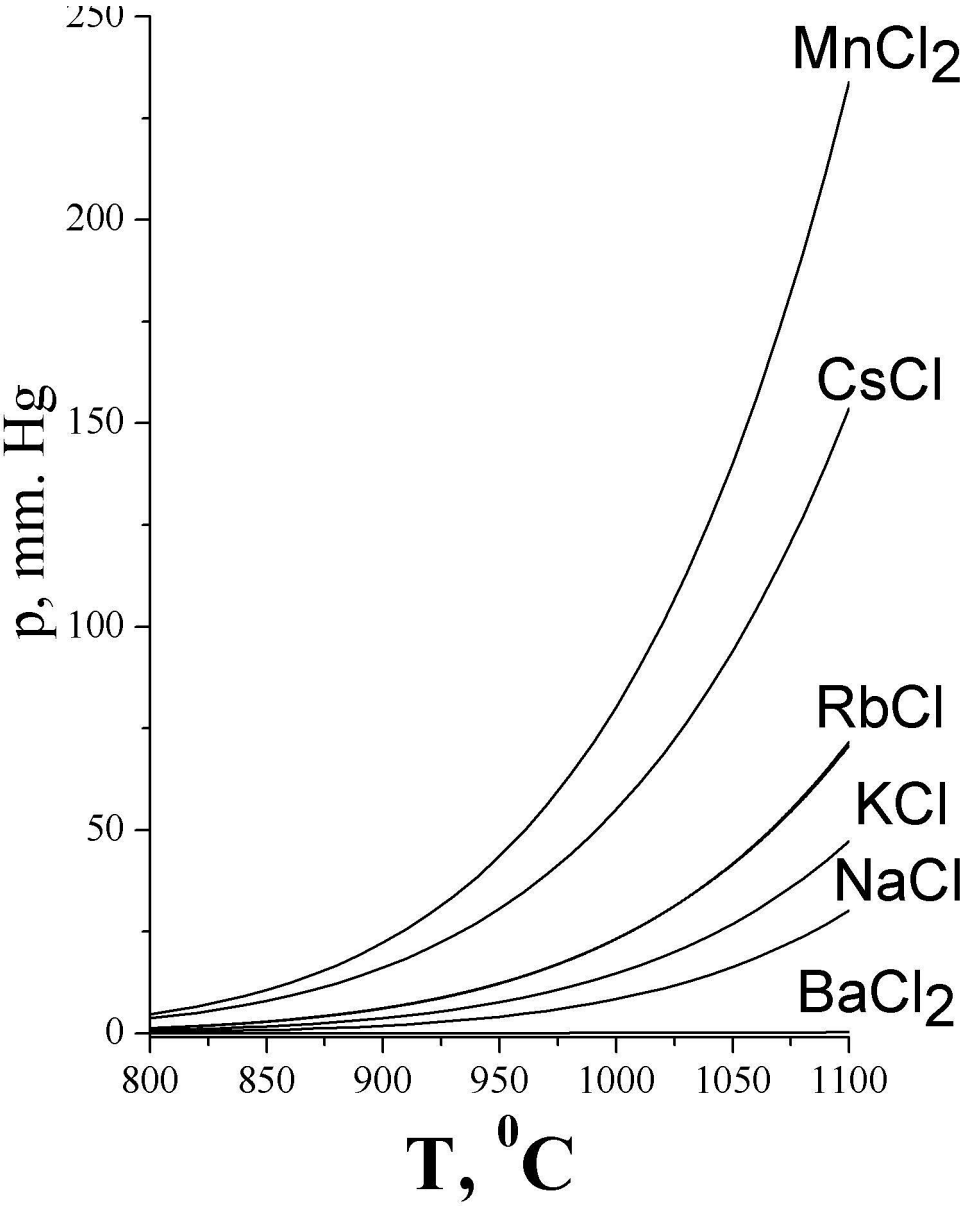

Fig.S1. Calculated data for equilibrium vapor pressure of different chlorides

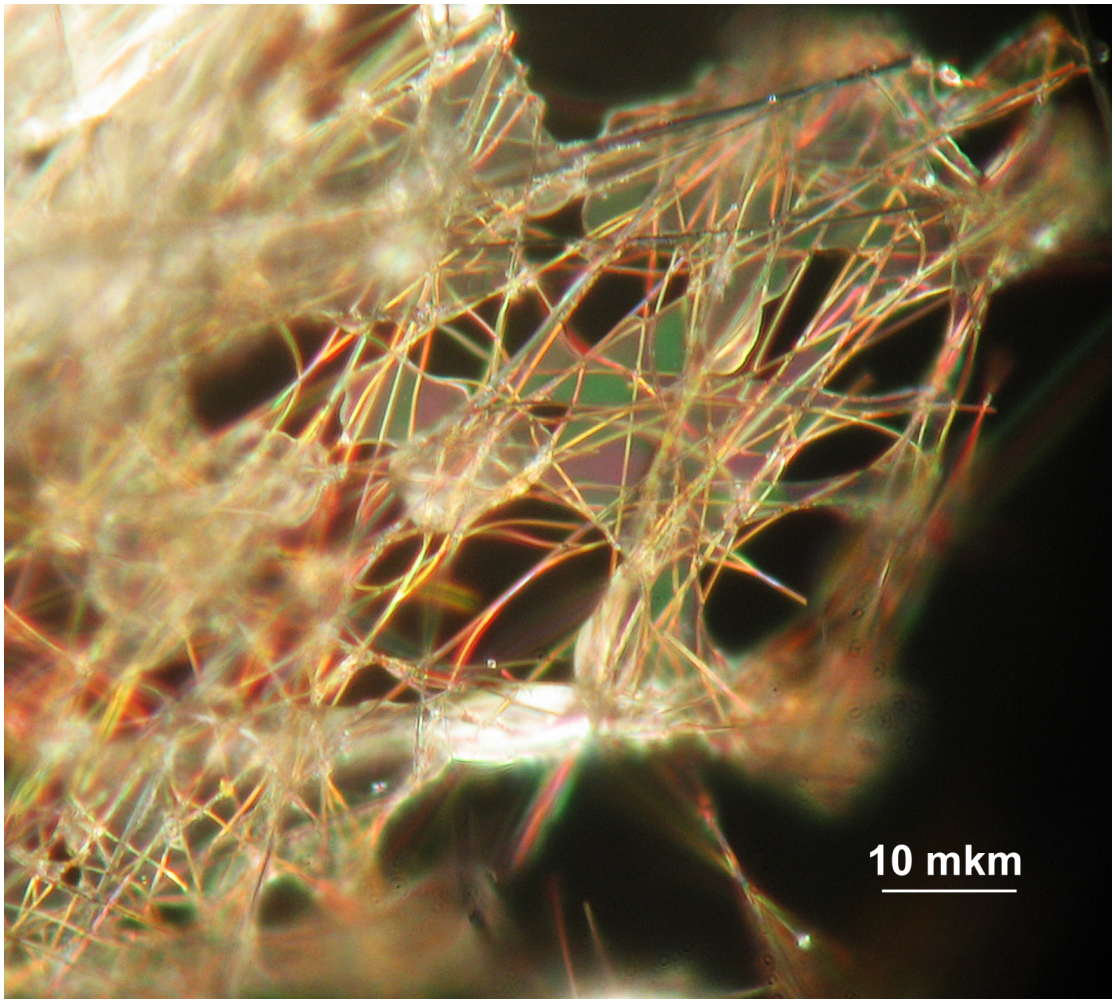

Fig.S2. An optical microscopy view of manganese oxide whiskers with residual KCl flux.

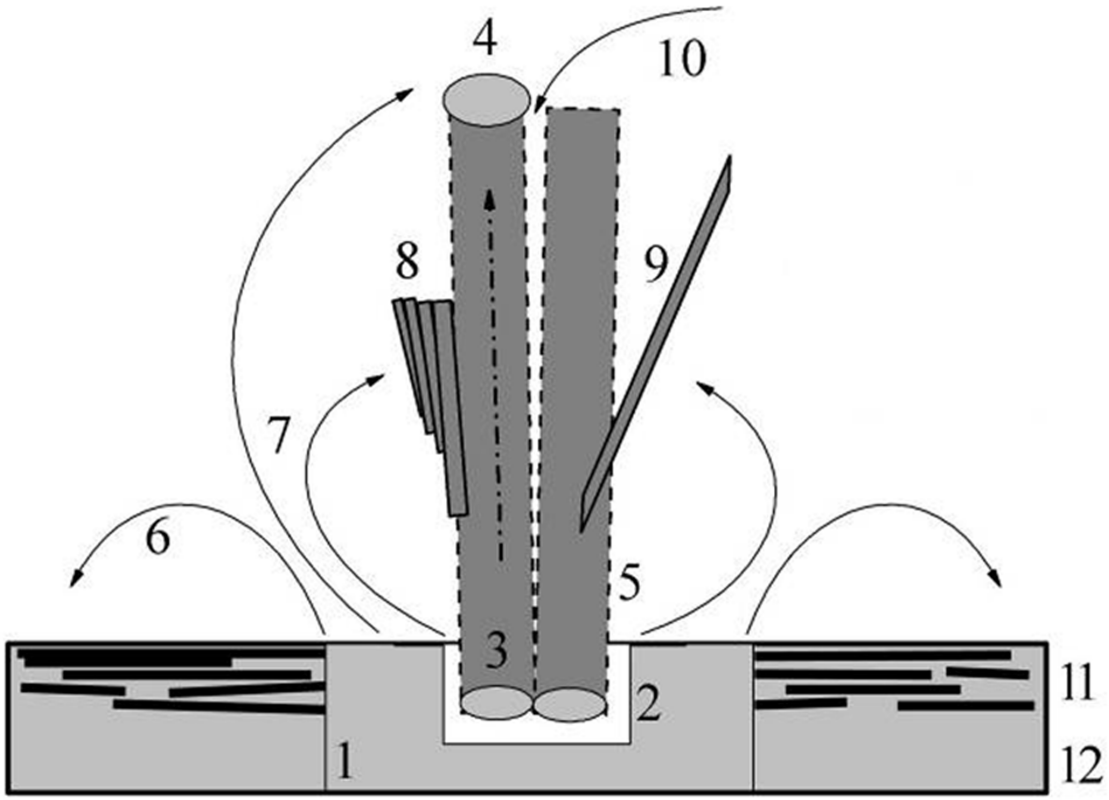

Fig.S3. A scheme of $Ba_6Mn_{24}O_{48}$ whiskers growth: 1 – reaction zone ($BaMnO_3$ pellet contacting with KCl); 2 – eutectic melt containing $BaCl_2$; 3 – a contact spot between a whisker growing up and a melt, several whiskers constituting pseudomonocrystal can form here; 4 – Ba-enriched melt on top of the growing whisker; 5 – a discontinuous film of $BaCl_2$ melt covering whisker surface and ensuring interaction with the gas phase components; 6 – enrichment of the gas phase with $MnCl_2$ and transportation of the chloride to the melt surface; 7 – $MnCl_2$ oxidation in air resulting in manganese oxides formation depositing on whiskers surface and interacting with $BaCl_2$ film; 8 – formation of side whiskers; 9 – growth of whiskers branches forming on creeping $BaCl_2$ droplets formed due to the $BaCl_2$ melt film rapture; 10 – preferable manganese oxide deposition between two growing whiskers, connecting them in one pseudo single crystal; 11 – oriented growth of the floating whiskers on the melt surface contacting with the air oxygen; 12 – inner area of the melt where whiskers growth is suppressed due to the lack of gas oxidizing agents.