Carbonic Inclusions in Natural Rock Salt and their Role in Development of Microstructure

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We present a study on the morphology and distribution of carbonic inclusions and the development of microstructure in natural rocks salt from the Zechstein in the NW-Netherlands and from the Triassic Ara Group, South Oman.
Hydrocarbons (HC) in rock salt are either trapped during rock salt formation (Herrmann and Knipping, 1993) or they migrated into the rock salt from external sources (Schoenherr et al., 2007). They occur as vapor (e.g., CH_4, and CO_2) or liquid HC and may be present within mineral grains, on the surfaces of cracks, or along grain boundaries.
It has been shown that dilatant deformation promotes the incorporation of HC's into typically low permeable rock salt (Popp et al., 2001; Schoenherr et. al. 2007). However, there is not much knowledge on the mechanisms of HC migration through the salt body and of the enclosure of HC into salt grains.
HC inclusions, trapped below a Zechstein anhydrite stringer sequence (750 m), in recrystallized rock salt occur in networks along grain boundaries. We observe morphologies ranging from films and interconnected channel systems to arrays of isolated inclusions. The morphology indicates that fluid films shrink and neck down to isolated inclusions. Fluids are connected in a triple junction network. Enclosed fragments of fine-grained anhydrite contain HC in larger proportions inside large, patchy multi-phase fluid inclusion. The adjacent recrystallized salt grains are clear and do not contain HC inside grains. Mobile grain boundaries redistribute HC during grain boundary migration recrystallization.
The Oman salt (3000 m) contains solid bitumen and oil, mainly along grain boundaries. The salt grains are substructured with some of the HC located along subgrain boundaries. The HC are interpreted being also transported during subgrain formation (Schmatz and Urai, 2011).

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