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Mechanistic Studies of Compacted and Sintered Rock Salt

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Abstract : This research addresses the densification via compaction and sintering of naturally occurring rock salt which was motivated by the fact that in a saline environment rock salt is thermodynamically stable and does show a mechanical behavior compatible to the surrounding host material. The sintering of rock salt powder compacts was systematically investigated using temperature and pressure as variables for the sinter process. The behavior of rock salt showed segregations of anhydrite, CaSO4 - the major impurity found in rock salt, to the grain boundaries between individual sodium chloride crystals. Powder compacts treated with lower pressures lost those anhydrite segregates over time while high pressure treated compacts remained with anhydrite segregates. The density reached in this study is 2.008 g cm-3 corresponding to a density of 92.5 % of the theoretical value. This high density is making the sintering a promising technique for rock salt as applications in underground appropriate environment.

Keywords : rock salt, sinter, anhydrite, nuclear safety
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