

A new self sealing and self healing backfill material for repositories in salt formations

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Abstract

A new backfill material based on anhydrous magnesium sulfate is presented in the paper. This material was developed and patented by GRS for the sealing of repositories in salt formations. The backfill consists of a reactive mixture of salt minerals that upon contact with brine increases its volume and reduces the pore space. Due to the formation of hydrated minerals the intruding solutions lose their water content. The water consumption leads to an over saturation of the remaining solution and to the precipitation of the over saturated phases. These combined effects lead to a thermodynamically stable mineral assemblage with hydraulically and mechanical properties comparable to the undisturbed rock salt. An essential advantage of the new material compared with others is the long-term stability of the resulting seal. The resulting mineral assemblages are in chemical equilibrium with the host rock and all potentially occurring brine compositions.

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