HLWYM HEmails

From: Richard Codell
Sent: Friday, October 17, 2003 9:00 AM
To: Roberto Pabalan; Sitakanta Mohanty
Cc: Gordon Wittmeyer; Andy Campbell; David Esh; Timothy McCartin
Subject: RE: MRS paper on deliquescence

Sitakanta:
When I was doing my thought experiment, I realized that we could speculate on many eventualities. In your scenario, it might depend on whether there was a big salt crystal or the salt was finely dispersed. Rather than speculation, I also proposed a simple lab experiment where we could actually look at what happens to the dust. Do you think there is any possiblilty of starting some experiments at CNWRA?
Dick

>>> Sitakanta Mohanty <smohanty@cnwra.swri.edu> 10/16/03 05:37PM >>>
Dick,
I had thought exactly the same way as you did. But then it dawned on me that capillarity does not come into picture according to the geochemists because one grain of salt can cause deliquescence effect. It is my understanding that localized corrosion may occur under that grain.
-Sitakanta

-----Original Message-----
From: R Pabalan [mailto:rpabalan@cnwra.swri.edu]
Sent: Thursday, October 16, 2003 4:15 PM
To: 'Richard Codell'
Cc: GWITT@cnwra.swri.edu; SMOHANTY@cnwra.swri.edu; 'Andy Campbell'; 'David Esh'; 'Timothy McCartin'
Subject: RE: MRS paper on deliquescence

Dick,

Good point. I'm not used to thinking in terms of capillary suction, but if the activity of water vapor in the intergranular space becomes greater than the activity of water at the deliquescence point of the salt mixture, then, yes a brine will form. On the other hand, if brines do form, those could be simply soaked up by the dust (if rock dominated) and not reach the waste package surface.

bobby

-----Original Message-----
From: Richard Codell [mailto:RBC@nrc.gov]
Sent: Thursday, October 16, 2003 3:49 PM
To: RPABALAN@cnwra.swri.edu
Cc: GWITT@cnwra.swri.edu; SMOHANTY@cnwra.swri.edu; Andy Campbell; David Esh; Timothy McCartin
Subject: Re: MRS paper on deliquescence

Bobby:
Thanks for the paper. I will read it right away. I am aware of the deliquescence phenomenon, but my point was slightly different. Since the dust is only slightly enriched in potentially deliquescent salts, and is

mostly insoluble rock, would the deliquenscence overcome the capillary suction of the finely dispersed dust so that liquid brine could evolve?
Dick

>>> R Pabalan <rpabalan@cnwra.swri.edu> 10/16/03 03:10PM >>>
Dick,

Attached is a pdf file of my MRS paper on salt deliquescence, in response to the following comment you made regarding the Risk Insight report.

"My question is: can the dust get wet unless water drips on it, or is it possible that it can get wet simply by humidity alone? I don't think anyone has shown that the latter can occur. Being a fine porous material with high capillary suction, the dust may remain in an essentially dry state from which no water can evolve. If it cannot get wet by itself, then a possibly major problem in the repository will be greatly diminished; i.e., dust accumulating on the waste package will not lead to deliquescent salts until such time as there is actively dripping water onto the waste package."

The answer to your question is yes, salts can get wet simply by humidity alone. You can test this by leaving a spoonful of table salt outside during a humid D.C. summer day.

If you have any questions on this topic, please contact me.

Thanks.

bobby

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Recipients:
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