# Nanoscale processes during the interaction of aluminosilicate and carbonate mineral surfaces with acid mine drainage (AMD)

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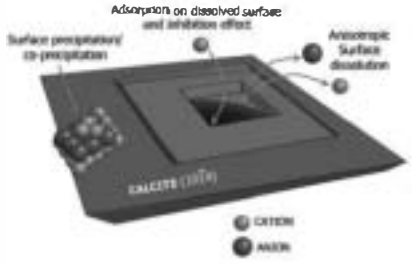
Macroscopic experiments (using pH-meter, ICP, XRD, SEM-EDS) have shown that the interaction of aluminosilicate and carbonate minerals with AMD is related to pH increase and subsequent removal of metals such as Fe, Mn, Zn and Pb. The subsequent study of the processes by means of advanced microscopic and spectroscopic techniques (*in-situ* AFM-AFM, XPS, RBS, Solid-State MAS-NMR) revealed distinct changes in the nanotopography and the composition of mineral near-surface layers, not particularly related to bulk structural changes. On the other hand, it was indicated that coupled dissolution and sorption (mainly surface precipitation/co-precipitation and *ad*sorption or even *ab*sorption) phenomena occur simultaneously at mineral-water interfaces.




Taking into account the above experimental data, generalized figures can be suggested in order to describe in nanoscale the various dissolution and sorption mechanisms taking place during interaction of AMD with aluminosilicate (zeolite) and carbonate (calcite) mineral surfaces.