Contribution ID: **142** Type: **Poster**

Fluid flow and reactive mass transport modeling of reducing mechanisms in the formation of unconformity-related uranium deposits

Wednesday 25 June 2014 17:00 (1 minute)

Unconformity-related uranium deposits in sedimentary basins represent the most important and profitable deposits among other types of uranium deposits, however their origin is still not fully understood. To better understand their formation, and in particular to address possible reducing mechanisms in the precipitation of uraninite, we develop a highly conceptualized 2-D model that fully couples fluid flow and heat transfer with reactive mass transport. We consider a series of numerical scenarios and examine the effect of graphite zone and Fe-rich silicates as the carbon-based and the inorganic-based reducing agents on the ore genesis. Our numerical results reveal that both the reducing mechanisms can lead to the precipitation of uraninite below the unconformity interface away from the faulted zone. Physiochemical parameters such as oxygen fugacity and temperature play a significant role in localization of the uraninite. Localization of these deposits is in relation to the decrease of oxygen fugacity, generally resulting from the interaction of oxidized uranium-bearing fluids with the reductants. Uraninites precipitate simultaneously with hematite in the areas experiencing reduction of oxygen fugacity and having a temperature of 180-200℃ and a pH of 2.5-4.5. Wide-spread alteration halos in the basement and around the uranium deposit include hematite, Mg-chlorite, and muscovite associated with minor amounts of pyrite and K-feldspar alteration. These results have important geological and exploration implications.

Author: Dr YANG, Jianwen (University of Windsor)

Presenter: Dr YANG, Jianwen (University of Windsor)

Session Classification: Poster Session

Track Classification: Advances in exploration and uranium mineral potential modelling