

2.5.P07**Reactor style modelling of fluid-rock infiltration and interaction using the HCh software package**

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Reactor style equilibrium modelling has seen limited application to the understanding of ore deposit processes, particularly at elevated pressures and temperatures. Beyond limitations in the thermodynamic data this has been a function of limitations in the modelling code and the inability to conceptualise and adequately simulate the types of fluid-rock interactions common in ore deposit formation. This work discusses the use of equilibrium reactor style modelling, using the HCh software package [1], to understand fluid infiltration front chemistry, fluid-rock interactions and associated mineral alteration.

Reactor style modelling can be used to explore a wide variety of fluid-(fluid)-rock interaction processes above and beyond the simple non-spatial batch 'titration' models. HCh with its control file structure can be used to investigate 0D non-spatial, 1D fluid-front (or flow-line) and 2D pseudo-spatial geochemical models that cover most of the range of fluid-rock interactions that can be envisaged for the mineral deposit forming environment [2,3]. Comparisons between the standard 'titration' models and 1D fluid-front reaction models, illustrate the effective role of the latter in helping to decipher complex alteration patterns and possible metal transport mechanisms without the use of full reactive transport. This work uses case examples from the Mt Isa Fe-oxide Cu-Au district of Australia.

References

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- [3] Heinrich, C.A. (1996) *Ore Geol Rev.* **10**, 319-338