

# The redeposition of ore matter in downwelling limb of hydrothermal cell of MOR

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It was shown previously [Silantyev et al, in press] that considerable amount of ore matter is redeposited in downwelling limb of hydrothermal system. The impregnated ore mineralization is formed in result. It is occurred in many serpentinized abyssal peridotites. The main goal of this investigation is determination of factors, which are controlled the redeposition of zinc, copper and lead in downwelling limb, and evaluation of ore matter most enriched fluid T-P parameters. Calculations were implemented on a basis of complex GEOCHEQ [Mironenko et al, 2008].

A series of equilibrium thermodynamic calculations was realized to estimate amount of redeposited zinc, copper and lead. It was used data of fluid composition that was obtained by kinetic modeling in [Silantyev et al, 2009]. Zinc and lead remains dissolved in upper part of the model section ( $\leq 85^\circ\text{C}$ ). Fluid pH changes from 7.7 to 8.7. The hydrothermal fluid loses ore matter at more high temperature ( $107\text{-}284^\circ\text{C}$ ). It is result of a pH increase (to 9.9) and a redox conditions change. Ore matter accumulates again in fluid in root zone of hydrothermal system ( $306\text{-}484^\circ\text{C}$ ; pH = 5 - 6.5).

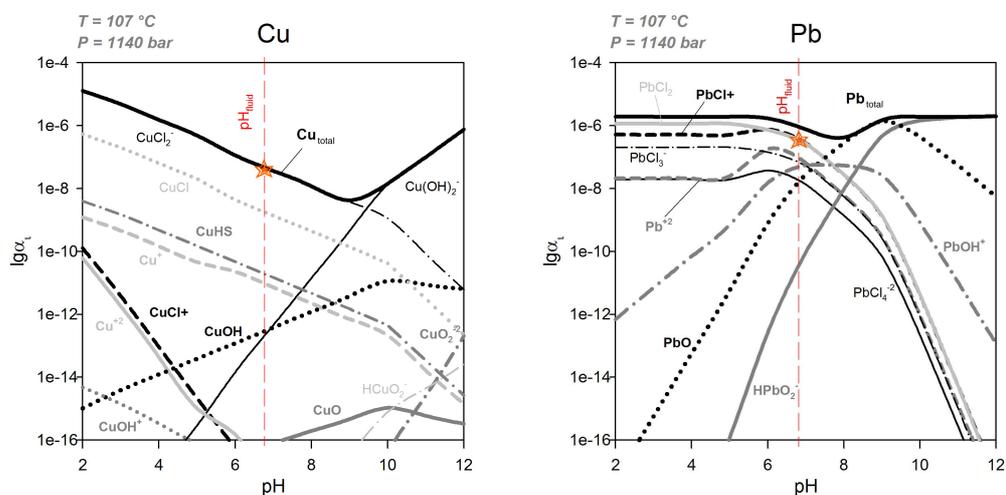


Fig.1. Copper and lead are in solution at  $T = 107^\circ\text{C}$  and  $P = 1140$  bar:  $\lg \alpha_i$  - compounds of copper and lead in solution (mol/kg  $\text{H}_2\text{O}$ ), star - the value obtained in [Silantyev et al, in press]

The estimate of the ore matter deposited in this block amount to incoming amount by olivine dissolution ratio shows that rock enrichment by copper takes place only at  $107^\circ\text{C}$ , zinc - at  $129^\circ\text{C}$  and  $195\text{-}217^\circ\text{C}$ , lead - at  $129^\circ\text{C}$ . The ratio of the come in upwelling limb of hydrothermal system ore matter amount to the total amount equals finally 7.5% for zinc, 9.5% for copper and 57.3% for lead.

The character of solution compounds is controlled by stability of compound and concentration (activity) of ligands [Krainov et al, 1988]. The stability of copper and zinc migration forms is

controlled by pH (fig.1). This relation isn't so distinctively for lead because chlorine compounds of it are most stable. The redeposition of ore matter considerable part at 107-129°C is linked by a redox conditions change.

Thus fluid enriches by ore matter in regions of low temperature (to 107°C) and high temperature (from 151°C-1460 bar for copper and lead, from 239°C-2120 bar for zinc).

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