

JORNADAS DO ICT

28 e 29 de maio de 2018
Faculdade de Ciências da Universidade do Porto



LIVRO DE RESUMOS



Instituto de Ciências da Terra

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Is a magmatic intrusion the source of Hg enrichment in the Douro Carboniferous Basin, São Pedro da Cova area?

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Recently, was reported in the Douro Carboniferous Basin, namely in São Pedro da Cova area, an unusual enrichment in Hg present in the coal samples as cinnabar (Moura et al., 2018). This study aims to understand and intent to explain this unusual Hg enrichment. The mineral matter identified in the coal samples comprise mainly quartz, pyrite, cinnabar, barite, chlorite, zircon, monazite, galena and spharelite. Evidence of post-depositional mineralization was, also, revealed. The trace elements abundance demonstrated an unusual enrichment of Hg and a coefficient concentration (CC) higher than 100, considering that the average Hg concentration for world hard coals is approximately 0.10 ppm, ranging from 0.01 to 1.0 ppm (Ketris and Yudovich, 2009). The primary factors of Hg enrichment in coal deposits are intrusion of low-temperature hydrothermal fluids and magmatic-hydrothermal fluids (Dai et al., 2012; Yudovich and Ketris, 2005). Therefore, a porphyry intrusion that was observed inside of the São Pedro da Cova mine (Teixeira and Fonseca, 1945) may be associated with Hg unusual enrichment observed in the coal samples from this area. The geochemical affinities may help to understand the mineral associations of the enriched elements, namely Hg, and thus to understand the source of the enrichment. Regarding Hg geochemical affinities, the correlation coefficient of Hg with the ash ($r_{\text{Ash-Hg}} = -0.18$) indicates an intermediate affinity and a high correlation is observed with Cs ($r_{\text{Cs-Hg}} = 0.95$) and Na ($r_{\text{Hg-Na}} = 0.82$). Since Pereira (1945) described the magmatic rock as a leucocratic granodiorite (green color) and a granodiorite (dark color), both enriched in Na minerals, this may explain the Hg-Na high correlation coefficient pointing out the magmatic intrusion as the origin for the Hg enrichment. On the other hand, Cs has CC considered as significantly enriched ($\text{CC} > 10$) and displays an intermediate affinity ($r_{\text{Ash-Cs}} = -0.21$). Its mode of occurrence is assigned to clay minerals, feldspar and mica (Orem and Finkelman, 2003). In this case, given the good relationship with Na ($r_{\text{Cs-Na}} = 0.82$), an association with plagioclase, from the magmatic fluids, is the most plausible mode of occurrence. Thereby, could the high correlation (0.95) between Hg and Cs be explained by the same source of enrichment? Could this source be the magmatic intrusion and its Na bearing minerals?

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