# Chemical compositions of zircon from an U-mine area, Portugal

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The Vale de Abrutiga U-mine consists of quartz veins containing wolframite, sulphides and secondary saléeite and metasaléeite.

One hundred thirty seven chemical analyses of zircon were obtained by electron-microprobe from unaltered and altered biotite granite, mineralized quartz veins, phyllite and quartzite of regional metamorphism and phyllite adjacent to mineralized quartz veins from the Vale de Abrutiga U-mine area, central Portugal. Chemical composition of zircon is higly variable. Zircon from altered granite is the richest in P, Y and $Fe^{3+}$ and contains on average 0.22 wt. % $UO_2$, but values up to 0.50 wt. % $UO_2$ were found in the analyses with low totals (~84.69 wt. %). Distribution of U in some of these individual altered grains shows a chemical zonation expressed in the rim containing more U than the core. The core has a chemical composition similar to that of zircon from unaltered granite. Zircon from quartzite has the highest content in Zr and the lowest of $Fe^{3+}$. Zircon from phyllite adjacent to quartz veins has higher U content than zircon from phyllite of regional metamorphism, which does not contain U. Zircon from mineralized quartz veins is dissolved and vacuolated. The grains have cores chemically close to the endmember [$(Hf,Zr)SiO_4$], but rims are hydrated, have very low totals (~82 wt.%), low $SiO_2$ (~14 wt.%) and $ZrO_2$ (~40 wt.%) contents and very high $Fe_2O_3$ (~8 wt.%) and $UO_2$ (~18 wt.%) contents. The anomalous zircon rims were lately formed from U-rich supergenic solutions. Enrichment in U is a characteristic of altered zircon from the mineralized quartz veins and from altered Variscan granite. The high U contents found in rims of the altered zircon from altered granite and mineralized quartz veins are associated to high Fe contents. It is well known that uranium sorption on Fe oxyhydroxides is an important process. Therefore the very high U-enrichment found in rims of altered zircon grains can be due to the presence of these Fe oxyhydroxides.

The Vale de Abrutiga U-mine was formed in lithological and structural traps by U-rich solutions derived from meteoric water, warmed by deep circulation, and enriched in U by the solubilisation of U-minerals from granites (uraninite, monazite). Uranium from U-rich solutions percolating through the quartz veins was later adsorbed by the most altered zircon or by Fe oxyhydroxides which formed in the most altered rims of zircon crystals.

# 3-D modeling of iron ore deposit in Chadormalu area in the Central Iran

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Chadormalu iron ore deposit is one of the biggest iron ore in Iran. That is located in the Central Iran and excavates iron ore in this area. Chamomile reverse fault and Kankani right lateral strike slip fault shear and deform ore deposit. Asymmetric ore deposit shape and faulting are some reasons that excavators have problems for exploration. Expansion of iron ore, distribution of contaminated ore (for example apatite) and recognized of blind faults concludes with use chemical analysis and logging boreholes data in deferent topographic levels. Deferent topographic levels data merge and design under ground 3-D models iron ore. Iron ore deposit is flattening and its strike is northwest - southeast. Iron ore massive dip is high angle and its dip direction is southwest. Stratigraphic iron ore boundaries are faulted and high angle. A lot of many strike slip fault distinguish with north - south strike into ore body. Designed 3-D models can be show best location for start of excavation. Therefore, we can subdivide ore deposit to several quality parts.