Linking TOC and trace elements characteristics for identifying paleoredox conditions in sedimentary copper deposit at Nahand-Ivand area, north of Tabriz, NW Iran

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The Nahand- Ivand area is located in the north of Tabriz, NW Iran. In the classification of the structural units of Iran, this area is situated in the western Alborz-Azarbaijan zone. Today, the Tabriz basin is an intra-mountain basin [1] which included the formation of organic-rich, laminated sandstone occurred repeatedly during the Miocene usually interpreted as a product of anoxic/euxinic conditions [2]. A total of 45 samples from the Qom Red Bed formation spatially sandstones of M_2^{mg} unit were analysed by ICP-MS for trace element and by Infrared for TOC. The trace element indices V/(V + Ni) have been used in this study to assess the paleo-redox conditions. This value varies from 0.3 to 0.7, indicating euxinic conditions and deposition in H_2S-containing bottom water [3]. Euxinic sediments are deposited in an anaerobic-reducing environment and are characterized by their black color, high organic content, presence of hydrogen sulphide. The total organic carbon content (TOC) of the M_2^{mg} unit is between 0.11 (unmineralized layer) and 4.36 wt.% (mineralized layer up to 35% Cu) with an average content of 0.9 wt.%. Our work shows that the organic matter could have acted as reductant and a source of sulfur for the formation of pyrite and catalyst for the cement dissolution and consequently copper sulfide mineralization [4].

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