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Epigenetic Monazite in Phyllites from the Pb-Zn Sulfide hosting Zawar Formation, Palaeoproterozoic Aravalli Supergroup, Rajasthan, N-W India.

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Sedimentary exhalative (SEDEX) deposits are sulfide-dominated Pb-Zn ore bodies with sphalerite and galena as the principal ore minerals, generally form through submarine venting of hydrothermal fluids through structurally controlled rifted sedimentary basins. They contain more than 50 percent of the world's reserves Pb-Zn mineralization. These deposits are generally associated with rifted intracratonic and passive margin basins worldwide and range in age from Paleoproterozoic to Tertiary. The sediments of ~1.7 Ga Zawar Formation[1], Aravalli Supergroup, host about ~20 Mt Pb+Zn sulfide deposits. These ore bodies are stratiform, banded pyrite-sphalerite ore, sometimes discordant, sphalerite-galena veins. The rock associations of the Zawar belt are composed of phyllite-quartzite-carbonate (arkosic dolostone) with greywacke along with some carbonaceous and dolomitic phyllites. Zawar belt has witnessed greenschist facies metamorphism. 90-170m thick turbidite deposits of siliciclastic-dolomitic carbonate succession rocks that host the Zawar Pb-Zn mineralization occurs in the Middle Aravalli Group. The SEDEX-Type ore mineralization in the Aravalli belt, principally of zinc and lead, is confined to the dolomitic rocks of the Zawar belt. In this study, we report the occurrence of monazite in the phyllites of the Zawar Formation. Scanning Electron Microscopic study (SEM) of the phyllites shows that the monazite is a secondary alteration product of silicate minerals. Such monazite occurs as veins within the host phyllites, which are produced through simple replacement or metasomatic replacement of primary host rock, i.e., the phyllite. Textural evidence supports the origin of this monazite is of epigenetic hydrothermal metasomatic origin formed after the formation of the primary host rock. Energy Dispersive X-Ray Spectroscopic (EDS) study of those monazite shows an average composition of P_2O_5 19.13, Ce_2O_3 19.16, La_2O_3 11.45, Nd_2O_3 8.16 , ThO_2 2.28. These monazites are potential candidates for dating the complex geological history of ore formation and hydrothermal alteration of the host rocks.

1. McKenzie, N.R. , Hughes, N.C. , Myrow, P.M. , Banerjee, D.M. , Deb, M. , and Planavsky, N.J. , 2013, New age constraints for the Proterozoic Aravalli–Delhi successions of India and their implications: Precambrian Research, v. 238, p. 120–128.