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## Genesis and Geochemistry of the Pahardiha- Rungikocha Gold Deposit in North Singhbhum Mobile Belt, Eastern India

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The Pahardiha- Rungikocha gold deposit is situated in the Chaibasa Formation of the Singhbhum Group within the Proterozoic North Singhbhum Mobile Belt (NSMB), in eastern India. The total gold ore reserve reported from the deposit is 0.487 million tonnes, with an average grade of 3.43 ppm. Field observations, coupled with petrographic studies, shows three-phase of deformations, i.e., D1, D2, D3. The deformation D1 and D2 represent the progressive regional metamorphism, and D3 shows the displacement fractures. The post-peak-metamorphic, i.e. D3 deformation, is associated with the gold mineralization within the quartz-chlorite schist. In this deposit, gold occurs as native specks hosted within the fractures network and along the grain boundaries of euhedral pyrite. The gold-bearing pyrite is coeval with the chromite cored magnetite (Mag-II), where euhedral magnetite rims show epitaxial overgrowth over the relict chromite cores. The Major oxide geochemical classification diagram indicates that the host rocks source belongs to wacke to Fe-Shale. The host rock geochemistry suggests the mixed source of felsic to mafic rocks. The critical element ratios indicate that the sediments have undergone moderate to high degrees of chemical weathering. The REE data reveal the enriched LREE while HREE shows flat to slightly depleted pattern. The REE shows the Eu negative anomaly, which indicates the feldspar fractionations. The chemistry of chromite cored magnetite (Mag-II) and host rock chemistry reveals that the host rock holds the primary control for the chemistry of chromite cored magnetite (Mag-II).