

**INDUSTRIAL MINERAL DEPOSITS OF PAKISTAN: SIGNIFICANT FOR
SUSTAINABLE DEVELOPMENT OF PAKISTAN**
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Abstract

This study attempts to summarize our current knowledge about the industrial mineral deposits which are significant for the sustainable development of Pakistan. Stibnite is reported from the Chitral state, Qila Abdullah, and Siahn and North Makran ranges. The estimated reserves of stibnite veins of Makran and Siahn ranges seem to be 1000 tons (small). Arsenic minerals orpiment and realgar are reported from Chitral state. They are associated with marbles and calcareous shales of probable Cretaceous age. Small deposits are also reported in the other places of Chitral state. The arsenopyrite, chalcopyrite and pyrite also occur in Dainyor and Jotiyal nals in Gilgit. Mercury and silver mineralization are reported as network of veins in the Oligocene Panjgur formation of western and eastern Waro area of Makran and Siahn ranges. Chemical results show highly anomalous mercury, silver and iron while slight anomalous Pb, Zn, Ni, Co, Cu, Mn, Cd and Au. Copper is best suited with subduction zone like Chagai, Raskoh and Wazhdad magmatic arcs, and Kohistan magmatic arc, spreading centre located far south of Pakistan and margins of lithospheric plates like northern and western Indus Suture (Waziristan), and Karakoram-Hindu Kush block. Boya, Dir, Drosh, Waziristan, Dasht Kain, Talaruk, Saindak, Other porphyry copper deposits in Chagai district is explored recently. It is estimated that Chagai region has large reserves of copper (averaging 0.4 to 0.6%) and associated gold (0.2 to 0.5gm/ton). Lead-zinc deposits are discovered from the Las Bela-Khuzdar region. The mineralization is found in the upper part of Lower Jurassic Shirinab Formation. Main deposits are Shekran, Ranj Laki, Malkhor (NW of Khuzdar), Gunga, Surmai (SW of Khuzdar, and Duddar (SE of Bela). The estimated lead zinc reserves of Pakistan are about 16mt. The Makki Chah is a zinc deposit. Bismuth, cadmium and cobalt are reported from the Lahor and Pazang areas 3 km N and SE of Besham, Besham nappe. Chromite occurs mostly in the Indus Suture (Western and Northern Indus Suture). Main localities of Chromite are Chilas, Besham Jijal, Kohistan, Harichand-Sakhakot-Qila west of Dargai, Kot-Pranghar (Mohmand), Bucha (Mohmand), Boya (Waziristan), Muslimbagh, Zhob, Bunap and Rayo Ras Koh, Wad, Sonaro and Ornach. The ophiolite contains lenticular or disseminated bodies of chromite. Liaqat et al. in 2012 mentioned anomalous Ni, Cr and Co at Teru, Yasin, Pakora and Bargot areas of Shyok Suture, North Pakistan. Asbestos is found in serpentines of the ophiolitic complex near Wad (Khuzdar), Muslimbagh and Naweoba (Zhob), Boya, Kaniguran (Waziristan), and Sakhakot-Qila area (Mohmand/ Malaknd). Manganese ore are ophiolite related mineralization in Kassai area of Lower Mohmand Agency, Sakhakot-Qila, Kot Pranghar, Qila, Behram Dheri, Narai Obe, Bucha, Newe Kili and Hero Shah and Shangla area of Swat; Thal, Shinkai Waziristan; Lahor-Pazang area, near Besham; from Galdanian, Chur Gali; The more important localities are Kharari

Nai, Siro Dhor, Sanjro Dhor, Bhampani Dhor, Gadani ridge and Dadi Dhor. The estimated total reserves of manganese in Pakistan is 0.5 million tons with manganese range from 15-48%. Nickle occurs in Malam Jabba; Souch (Kaghan) and Swat and Shangla-Alpurai areas. Tungston occurs in Oghi Hazara, Susagali granite, Amalaf Chagai and Miniki Gol area of Chitral. The placer sheelite occurs in the Siran River sand (Mansehra district) and in the Indus River of northern areas where it is estimated 96 tons of detrital tungsten minerals in about 40 million tons of placers. Mica/muscovite has been done near Baltit, Dasso, Mogh, and Kasu northeast of Drosh. In the Kohistan magmatic arc, mica has been worked at Khadong Banda (near Dir). In the Himalayan crystalline zone, mica deposits have been reported from Astor, Bagarian, Hawa Gali, and in the Neelam valley of Azad Kashmir. Among these the better deposits are the ones in the Neelam valley and near Astor. Significant deposits are found in Rajdhwari pegmatites (significant, 0.2-3%) and Tangali hill of Hazara district. Lithium/Lepidolite occurs in Shengus of Nanga Parbat Massif; Bagarian, Hawa Gali, Giddarpur and Koga areas. Niobium and platinum occur in Chilas, Jijal, Sakhakot Qila (west of Dargai) and Loe Shilman of Khyber Agency. Rare earth occurs in Koga (Swat), Sillai Patti (Dargai), Loe Shilman (Khyber Agency) and Sakhakot-Qila (Malakand) areas. Sulphur at Sanni occurs as veins or as replacement of sandstone matrix in the Nari Formation. The reserves are estimated at about 58,000 tons. Koh Sultan deposit is located in the Koh Sultan volcano with 738,000 tons reserve. Alum has been manufactured in the past from pyritiferous shales of Gajbeds from Maki Nai, shales of Ranikot group and Nari/Gaj group and at Shah Hassan near Trimi. Bituminous alum shale has occurs possible Carboniferous age near Shahidmena in Khyber Agency, in Jatta and in a gorge near Dozha Banda in Kohat area. Nearly pure alunogen occurs in veins in sulphur at Sanni. Alum occurs in Koh Sultan (Nok Kundi area). Alum shales occur in two horizons in the Salt Range near Kalabagh. One in Eocene rocks (10feet alum shale), and other in Jurassic age (alum shales 25-40feet thick). The shale from which alum is manufactured contains on average 9.5% sulphur. Many salts deposits and lakes are located in the vicinity of Makran coast and Hamun Mashkel area. Alum may also be associated with these salts. Soapstone/Talc deposits occur in Kharwala Nala (Kurram Agency), Jamrud (Peshawar), Khyber Agency; Derai (Swat), Sherwan (Abbottabad) and Golen Gol (Chitral) areas. The Sherwan deposit is the major producer of soapstone in the country. Soapstone deposits of Kurram agency have been estimated to contain 1.6 million ton of reserves. The ophiolitic and volcanoclastic rocks in the Wazhdad area and its vicinity show soapstone mineralizations. Graphite occurs in Chalt, Chhelish, Bola Das and Mohriwal Baikh of Gilgit area, Stak-Pondu Shigar Nala Baltistan, Chota Kazi Nag mountain northern slope of Jhelum river. It is found in Shah Salin, Momi village, Mohzigram Gol and Barzin valley of Chitral state; Norang and Babusar pass, Sherwan, Haripur and Garhi Habib Ullah of Hazara district, Sper Tor (Landi Kotal). Shahidmena and Lowaramena of Khyber Agency, Majk to Kundi and Dheri village in Mardan district, Loe Agra in Malakand. It has also been reported from Sheikh Wasil of Mashelakh Range. Kyanite quartz veins in mica schist occur in the near south of Jabba of Hazara district. Kyanite schists occur in south of Kuza Banda rest house at Oghi-Batgram road. It is also found in Landakai at frontier boarder of Malakand-Saidu Sharif road and near Tindodog police post in Swat state. Vermiculite deposits (11 mt) are reported from Doki River on the northern edge of the western Raskoh. The vermiculite contents vary from 5-20%. Exfoliation tests at 775 °C resulted in tenfold increase in the particle size. Further pumice from Chagai area, millstone and quartzite from Pab quartzite/sandstone (more than 2bt of the Fort Munro anticlinorium above the ground surface) of D.G.Khan, lake Salt and associated trona from Sindh has been reported so far.