Salt Lake deposits of Thar desert: Source of Trona, Halite, Gypsum and a hope for Lithium-bearing minerals

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Pakistan is such a blessed country where all types of natural resources are present; some of which are being exploited whereas, others need to be exploited for the economic growth of the country. Among these natural resources; the deposits of diverse nature are also found bearing good potential of strategic mineral concentrations such as the REEs including lithium ores. Along with these mineral resources, the evaporites are also noteworthy being the natural source of different metals including lithium, which can easily be processed with low cost. Different kinds of evaporites are reported from various regions of the country i.e., Chagai district of Balochistan province and Sanghar, Shaheed Benazirabad, Umarkot and Tharparkar districts of Sindh province. The salt lakes of these evaporites are diverse in size, shape and mineral contents due to varied sources of such salt/evaporite deposits. The present study is aimed at the proper mineral characterization and possible source of these Salt Lake deposits/evaporites of Quaternary to Recent age. During fieldwork, representative samples were collected from salt lakes in Thar desert for analyses using X Ray Diffraction (XRD) and Energy Dispersive Spectroscopy (EDS) techniques. Thin laminations of different evaporites having the thickness of a few centimeters and at places encrustations from a few centimeters up to 2 feet were observed. The XRD results indicate that the evaporites of the salt lakes of Thar desert are of diverse nature. In Taulka Nangar Parkar, the major salt is halite (NaCl) along with some concentration of gypsum ($CaSO_4.2H_2O$) and polyhalite; while the lakes of Sanghar, Shaheed Benazirabad and Umarkot are rich in Trona along with halite and gypsum. The current XRD and EDS results do not show any presence of lithium-bearing minerals but it is possible that lithium-bearing salts in minor quantity could be embedded because salt

lakes of similar nature are the good producer of lithium in different regions of the world. Therefore, detailed studies are required for investigating the lithium bearing minerals of economic potential in the extended areas of these salt lakes.