

ANALYSIS OF MAJOR & MINOR ELEMENTS IN METEORITES BY SEM-EDS AND PGNA.

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INTRODUCTION: Major, minor and trace elements have played a significant role in identifying the elemental abundances in meteorites. Fe, Ni and Co are frequently used to identify a meteorite due to their high melting point. Hence, knowing the concentrations of these elements is pivotal in identifying the meteorites. In the present study analysis has been carried out on a meteorite sample from North West Africa region (referred hereon as NWA region) (Provisional name is NWA 2909), Dhofar 020 (Oman) and Sikhote-Alin (Russia) using SEM-EDS technique.

RESULTS: The reason behind looking at the bulk composition of elements in Dhofar 020, Sikhote Alin meteorite and the meteorite from NWA region by PGNA was to compare the elemental compositions to that in Solar nebula. For meteorite from NWA region, an attempt was made to classify it by comparing the SEM results with that of some well-studied meteorites. Hydrogen and Boron has been detected in Dhofar 020, Sikhote Alin and North West Africa region meteorites. In Dhofar 020, the Hydrogen value by PGNA is 0.224 %, in Sikhote Alin it is 170mg/kg and in North West Africa region meteorite it is 730mg/kg. Boron value in Dhofar 020 is 1.17mg/kg, in Sikhote Alin it is 0.83mg/kg and in North West Africa region meteorite it is 0.90mg/kg. In the Earth's crust, Boron is found to be 1500ppm. While Dhofar 020 seems to be enriched in Hydrogen (when comparison of PGNA results with Earth's crust composition is made), Sikhote Alin and North West Africa region meteorite are found to be depleted in Hydrogen. Comparing the values of Boron in Dhofar 020, Sikhote Alin and North West Africa region meteorite with the earth's crust it is observed to be depleted in all the above three meteorites. So far no compositional analysis of this particular North West Africa region meteorite sample has been done. In PGNA bulk compositions of elements were studied and 19 elements were detected. Dhofar 020 is an H4/5 Chondrite ^{[1], [2]}.

DISCUSSION: Though Dhofar is a stony meteorite its Fe content is the highest amongst the elements determined. Cl in stony meteorites is observed to be in the range 66 – 130ppm ^[6], while in the earth's crust Cl is found to be 0.017%, where as in Dhofar 020, it is found to be 4.64 average wt %. This could be possible due to the inhomogeneous distribution of Cl within the meteorite or due to absorption of Cl accessory minerals (Chlorapatite and Lawrencite). Sikhote Alin meteorite results by SEM/EDS show Fe to be the highest amongst the other elements i.e. 87.54 wt. % average and Ni to be 2.54 wt % average and are in agreement with Plavčan results ^[4], confirming it's through nature of iron meteorite. For North West Africa region meteorite, the analysis determined by SEM/EDS shows that Fe content is found to be 85.23 wt % average, Ni content is 9.92 average wt %. The value of Fe and Ni in North West Africa region meteorite by SEM/EDS is much higher than it is for mesosiderite class.

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