NEWS AND NOTES

Super High Organic Sulphur (SHOS) in Tertiary coals of North-East India

Manabendra Nath

Department of Geology, Gurucharan College, Silchar, Cachar - 788 004, India *E-mail: dr.manabendra.nath@gmail.com*

Received: 23 October 2023 / Accepted: 5 November 2023 © 2023 Geological Society of India, Bengaluru, India

Coals of North-Eastern region of India are located far away from the main Gondwana producing coalfields. These Tertiary coals have formed in two different geotectonic settings-one under foreland basin of Oligocene age coals of Assam, Arunachal Pradesh, Nagaland and the other in Platform basin of Eocene age coals of Meghalaya. Tertiary coals are unique because of certain characteristics like high caking index, high hydrogen content, high sulphur content (above 3%) (Singh et al., 2012). All forms of sulphur like pyritic sulphur, sulphate sulphur and organic sulphur are observed in these coals where organic sulphur predominates the other forms of sulphur.



Fig. 1(A), 1(B) & 1(C). Hard lump coal samples collected from Mon district of Nagaland showing the characteristic appearance of nodule.

Coals of Mon district were studied for their physico-chemical characters. The speciality of these coals is Super High Organic Sulphur (SHOS) which varies from 8% to 11% in all the six samples analysed as per Chou classification (Chou, 1997a, 2012). As per Chou classification coals with less than 1% sulphur is low-sulphur coal, with 1% to <3% is medium sulphur coal and with >3% is high sulphur. Here the sulphate sulphur content varies from 0.75% to 0.90%, pyritic sulphur 0.29% to 0.70% and organic sulphur from 6.55% to 9.52%

(Table 1) which clearly indicates organic sulphur dominates the other two forms of sulphur and as such classed as SHOS

The super high Organic sulphur coals are highly enriched in organic

Table 1. Sulphur content in coals of Mon district, Nagaland

Sample No.	Total Sulphur	Sulphate Sulphur	Pyritic Sulphur	Organic Sulphur	
1	8	0.75	0.70	6.55	
2	9	0.90	0.52	7.58	
3	10	0.85	0.40	8.75	
4	11	0.86	0.62	9.52	
5	9	0.92	0.55	7.53	
6	8	0.75	0.29	6.96	

sulphur. This could be because of highly marine influenced coal bearing measures as observed by Shao et al. (2003a) in other parts of the world like China, Russia, Croatia. The deposition of organic sulphur in this coal occurred on a marine platform where sea-water sulphate was plenty but iron depleted. Therefore there was scanty pyrite formation. The organic sulphur developed during an early stage of the coalification process (humification) when plant debris was decomposed by bacterial activity to a premaceral humic substance. This SHOS require further study like FTIR, sulphur isotope in order to understand their source and chemical bondage.

Acknowledgement: The author is thankful to the Director, Central Drug Research Institute (CDRI), Lucknow for allowing the samples to be analysed.

References

- Singh, P.K.; Singh, M.P.; Singh A.K.;Naik, A. (2012) Petrographic and geochemical characterization of coals from Tiru Valley, Nagaland, NE India; Energy Exploration and Exploitation; pp.171-192
- Chou, A.A. (2012) Sulfur in coals: A review of geochemistry and origins; Int. Jour. Coal Geol., pp.1-13
- Chou, C,L. (1997a) Geology factors affecting the abundance, distribution and speciation of sulfur in coals. *In:* Yang, Q. (Ed.). Geology of Fossils Fuels, Proceedings of the 30th International Geological Congress: Part B. VSP, Utrecht, The Netherlands, v.18, pp.45-47.
- Shao, L. Jones, T. Gayer, R. Dai, S.Li.S., Jiang, Y. Zhang P., 2003a. Petrology and geochemistry of the high-sulphur coals from the Upper Permian Carbonate coals measures in the Heshan coalfield, southern China, Int. Jour. Coal Geol., v.55, pp.1-26.