

NOTE

Characterization and Exploration of Lignite for the Adsorption of Lead(II) Ions

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The adsorbent lignite was subjected to proximate analysis and the various parameters were reported. It was used for the successful adsorption of lead(II) species from wastewaters.

The lignite was collected from Neyveli Lignite Corporation, Tamil Nadu, India, ground well, dried and sieved using a mechanical sieve (Jayant Laboratory Instruments, India) to various sizes. The size of the particles of the adsorbent used for the study of removal of lead(II) is 0–63 μ . In the present investigation, batch mode experiments were conducted and the maximum removal of lead(II) using the adsorbent lignite was found to be 37.4% and it is found to be successful in such a way that it is economically feasible and easy availability of lignite is much favoured¹. Various models such as Lagergren², Bhattacharya-Venkobachar³ and Weber-Morris⁴ were tested. The results of all these models suggest that lignite can be used as an efficient adsorbent for the removal of lead(II) species.

The particles of lignite were subjected to proximate and ultimate analyses (CART, NLC, Neyveli). The various parameters were evaluated and tabulated (Table-1).

TABLE-1

S. No.	Parameter	Value (%)
1.	Moisture content	8.79
2.	Ash content	2.4
3.	Carbon	56.55% (Fixed C 41.66)
4.	Hydrogen	4.33
5.	Sulphur	0.60
6.	Nitrogen	0.91
7.	Oxygen	26.42
8.	Volatile matter	47.15
9.	Apparent density	0.539 g cm ⁻³

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The surface area was determined by BET method using nitrogen as the absorbent at liquid nitrogen temperature. The analysis was carried out in Omnisorb 100 CX, Coulter, USA. The pore diameter was also determined. They are presented below:

Surface area	—	5.83 m ² g ⁻¹
Pore diameter	—	1–2 nm

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REFERENCES

1. A Jafar Ahamed, Ph.D. Thesis, Removal of Lead by adsorption dynamics and impact of lead on the fish *Mastacembleus armatus* (Cuv. and Val.), Bharathidasan University (1998).
2. S. Lagergren Bil K., *Svenska Vatenskapskad, Handl.*, **24**, 1898 (1989).
3. A.K. Bhattacharya and C. Venkobachan, *J. Environ. Engg.*, **110**, 110 (1984).
4. W.J. Weber and J.C. Morris, *J. Sanit. Engg. Div., ASCE*, **89(SA2)**, 31 (1963).

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