

Supplementary data

1. Scanning electron microscopy & EDX analysis

The scanning electron microscopic analysis of coal fly ash and zeolite is shown in Figure 1 below. A distinct difference in morphology has been observed in the figures below. Figure 1 (b) shows that the zeolite has particles of random sizes; however, Raw coal fly ash has bigger particles as represented in Figure 1 (a) ¹. The elemental composition of raw coal fly ash and zeolite reveals that carbon, oxygen, aluminum and silicone are dominating in both as mentioned in Table 1. There are some traces of copper and iron which leach out while the zeolite synthesis ².

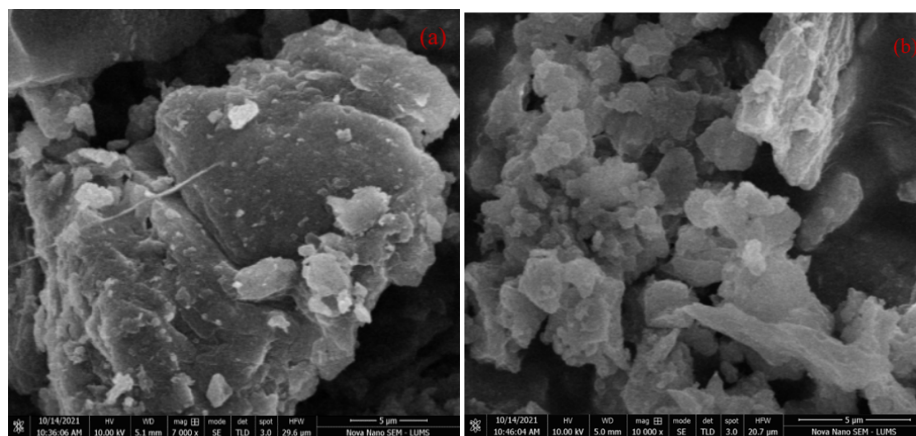


Figure 1 SEM images of (a) raw coal fly ash and (b) zeolite

Table 1 Elemental composition of Raw coal fly ash and zeolite

Elements	Raw coal fly ash	Zeolite
Carbon	27.68	18.05
Oxygen	42.33	47.67
Aluminum	10.65	11.85
Silicone	13.5	19.46
Copper	0.07	0
Iron	1.95	0
Titanium	1.98	1.18
Gold	1.84	1.79

References

- 1 V. K. Yadav, R. Suriyaprabha, G. K. Inwati, N. Gupta, B. Singh, C. Lal, P. Kumar, M. Godha and H. Kalasariya, *Adv. Mater. Process. Technol.*, 2022, **8**, 301–319.
- 2 S. Sivalingam and S. Sen, *Appl. Surf. Sci.*, 2018, **455**, 903–910.