

## HYBRID MATERIALS CONTAINING NANOSIZED CLAY AND NATURAL FIBRE

Tanushree Choudhury and Nirendra M. Misra

Indian School of Mines, Department of Applied Chemistry, Dhanbad, INDIA  
tanu\_c79@yahoo.co.in

Clay particles that have the sizes a few nanometre thick, if properly dispersed in the polymer matrix impart unique combinations of physical and chemical properties that make these composites suitable for making coatings and films for a variety of industrial applications. Physical properties of nanocomposites can depend on the size of the incorporated colloids [1]. Clay minerals have also been used in making nanocomposites. A delaminated clay-polymer composite exhibit improvements in strength, modulus, thermal resistance etc [2]. Delamination (or, exfoliation) of clay depends on the dispersion of clay, and property of the composites depend on the interaction of delaminated clay with the polymer or, fibre. Natural fibre reinforced composites are employed as substitutes for synthetic fibre reinforced composites [3].

In the study hybrid material was prepared using montmorillonite clay and agave fibre. A natural dispersant was used for preparing exfoliated clay. Characterization of the materials were done using DSC, FTIR and SEM (Fig 1) Results show a show better dispersion of clay (by using a natural dispersant) and greater compatibility with natural fibres with finely dispersed clay particle. Such materials have great potential as a eco-friendly composite.

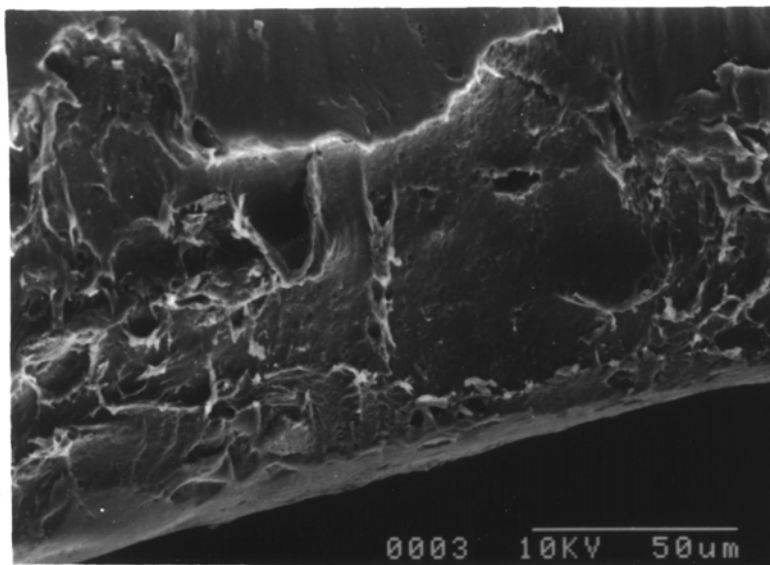


FIG.1 SEM of Hybrid material containing dispersed clay and natural fibre

### References

- [1] W. Caseri, *The Chemistry of Nanostructured Materials* (Peidong Yang, ed.), World Scientific, Singapore, (2003).
- [2] D. Schmidt, D. Shah, E. P. Giannelis, *Current Opinion in Solid State and Materials Science* 6 (2002) 205.
- [3] M. M. Thwe and K. Liao, *J. Materials Science*, 38 (2003) 363.
- [4] Y. Deng, J. B. Dixon and G. N. White, *Clays and Clay Minerals*, 51 (2003) 150.
- [5] R. D. Davis, J. W. Gilman, T. E. Sutto, J. H. Callahan, P. C. Trulove and H. C. De Long, *Clays and Clay Minerals*, 52 (2004) 171.