Synthesis and Properties of Heat-Stable Expanded Smectite and Vermiculite[1]

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Abstract: When aqueous dispersions of Na^+-smectite or n-butylammonium-vermiculite react with sulfate salts of Fe(II), Co(II), or Ni(II) bipyridyl or 1, 10-phenanthroline complexes in excess of the cation-exchange capacities, intersalated phases with spacings of about 29.5 Å are obtained. Thermal decomposition of the intersalated complex cations affords expanded phases with a d(001) spacing near 18 Å for the smectites and near 28 Å for the vermiculites. These phases are stable to temperatures of at least 550 ° C. Nitrogen surface areas of the fired products are as high as 400 m^2/g.

Key Words: Expanded Clays • Heat-Stable Clays • Hectorite • Intercalation • Intersalation • Phenanthroline • Smectite • Vermiculite

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