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Structure of nucleic acids and nucleotides adsorbed on alumino-silicate nanotubular-structure

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The reactivity of clay mineral surfaces drives many geochemical processes on Earth. Recent research has shifted towards other fine, reactive particles, particularly nanoparticles, for their role in delivering active substances, their surface reactivity etc. A specific class of naturally occurring nanoparticles, similar in composition to clays but with a tubular structure, is found in volcanic soils. These aluminosilicates feature an outer layer of aluminum oxyhydroxide and an inner layer of silicates. The project examined how nucleotides and nucleosides adsorb onto these nanotubular particles using chemical techniques, separation methods, and spectroscopy. The study quantified adsorbed monomers and determined the atomic structure of surface complexes thanks to X-ray absorption spectroscopy at the P K edge, revealing the role of phosphate groups and comparing the adsorption mechanisms of DNA and RNA.

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