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Synthesis of carbon nano-structures using organic-molecule intercalated taeniolite layered silicates TAKAAKI MAEZUMI, NOBORU WADA, Toyo University, Japan — By calcinating organic-molecule intercalated taeniolite layered silicates, carbon nano-structures were made between the 2:1 layered silicate sheets. Raman scattering, XRD, TGA and SEM were used to characterize the samples. Large taeniolite crystals (NaLiMg$_2$Si$_4$O$_{10}$F) were first prepared by melting appropriate chemicals at high temperatures using a platinum crucible. Then, the taeniolite crystals made were cation-exchanged with Li$^+$, K$^+$, NH$_4^+$, Ca$^{2+}$ and Mg$^{2+}$ in salt solution. Finally, various organic molecules such as ethylene glycol, pyridine and so on were intercalated into the taeniolite crystals, and calcinated under a N$_2$ atmosphere at about 1000K. The resulting crystals are usually gray or black. X-ray (00l) diffraction patterns suggested that the carbon structures may be monolayer thick (i.e., graphene-like). Raman scattering spectra which exhibited a sharp G-band peak with a high G-band/D-band ratio indicated that the carbon structures were relatively well crystallized. Cation and organic-molecule dependence on the carbon structures will be discussed. In addition, evidence for stage-2 taeniolite will be presented.

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