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Stress-strain relation of K4 phenolic resins by classical MD simulation KATSUMI HAGITA, National Defense Academy of Japan — From viewpoint of collaboration among mathematics, material sciences, and physics, K4 lattice has been much interested. K4 lattice is confirmed to be backbone of Schwarz G surface, which is one of triply periodic minimal surface called Gyroid. Double Gyroid is nested lattice of two single Gyroid. As exploration of new materials inspired from pure mathematics, we proposed K4 Phenolic resins. The resins consist of Phenol and hydrocarbon originated from formaldehyde. The hydrocarbon has a role to connect two phenols. Maximum number of connection from one phenol is 3. Then, as an ideal case, backbone of Phenol resins can be form K4 lattice structure. In the present study, for studying elastic modulus, we performed classical MD simulation with deformation by using LAMMPS packages to estimate stress-strain relation.

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