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Mechanical Properties of Bacteriophage P2 Capsid VAN CHIEN BUI, Department of Physics and Nanoscience, Sunmoon University, Ahsan, Chungnam, 336-708, South Korea, KYOUNG JIN KIM, Department of Life Science, Sunmoon University, SEONG SOO CHOI, Department of Physics and Nanoscience, Sunmoon University, Ahsan, Chungnam, 336-708, South Korea — The mechanical properties of bacteriophage P2 capsids have been examined by nanoindentation technique by means of a tip of an atomic force microscope (AFM). Studies have been carried out on fully filled and 2/3 filled capsids containing dsDNA genomes. The phage sample was prepared on a copper grid with support film through a specific procedure for the transmission electron microscopy observation, and on pure glass substrate for AFM measurements. In order to get the quantitative information of the capsid elasticity, the force curves between the AFM tip and the phage capsids have been measured. The contact region of the force curve in approach mode has been used for the calculation of the Young's moduli as well as the internal pressures of the capsids. Using the continuum theory of elasticity for thin homogeneous shells we deduced the Young's moduli of fully filled and 2/3 filled phage capsids of 1.17 $\pm$ 0.10 GPa and 0.87 $\pm$ 0.10 GPa, respectively. Analysis of the force curves also showed that fully filled capsid stores higher internal pressure than 2/3 filled capsid does. The detailed explanation for the calculation of the Young's modulus and internal pressure will be discussed.

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