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Topological defects of tetratic liquid-crystal order on a soft spherical surface[1] YAO LI, Tsinghua Univ. and Univ of Waterloo, HAN MIAO, HONGRU MA, Shanghai Jiaotong University, JEFF CHEN, Univ of Waterloo — We model the orientational and positional order of tetratically shaped molecules, each having four-fold structural symmetry, confined on a spherical surface. Our Monte Carlo simulation shows that at a high molecular density, a tetratic orientational order develops in the system, accompanied by eight disclinations arranged in an anticube form on the hard spherical surface. We also consider an elastic-energy model, which consists of both Helfrich and Frank energies for a soft surface; the solution confirms the Monte Carlo study and further predicts the tetratic morphology that can be realized on the surface of a soft vesicle. Assuming that the induced interaction between these disclinations are repulsive, we demonstrate that the anticube structure has a lower free energy than, for example, the cubic structure.

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