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Thermal Expansion Coefficients of Thin Crystal Films

HUANG Jian-Ping, WU Xue-Zhong, and LI Sheng-Yi

Mechatronics Engineering Institute, National University of Defense Science and Technology, Changsha 410073, China
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Abstract: The formulas for atomic displacements and Hamiltonian of a thin crystal film in phonon occupation number representation are obtained with the aid of Green's function theory. On the basis of these results, the formulas for thermal expansion coefficients of the thin crystal film are derived with the perturbation theory, and the numerical calculations are carried out. The results show that the thinner films have larger thermal expansion coefficients.

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Key words: thermal expansion coefficients, thin crystal film, Green's function, perturbation theory

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