Reply to "Comment on 'Understanding the Epitaxial Growth of SexTey@Te Core–Shell Nanorods and the Generation of Periodic Defects'"

■ As Dr. Jasinski noticed, the periodic contrasts in the transmission electron microscopy (TEM) images apparently exhibit the characteristics of a Moiré fringe. Moiré fringes normally visualize dislocations, especially misfit dislocations between epitaxial heterostructures.[1−4] We adapted the concept to analyze the contrast oscillation as the defects in the core region. The fringe pattern in this study is not very periodic compared with the good regularity shown in the core–shell nanowires prepared *via* vacuum processes.[1−4] The difference is attributed to the mechanism of defect generation as well as the broad interface between the core and the shell. In the vacuum processes, misfit dislocations in an epitaxial layer are restricted at the clean-cut interface, normally without additional defects in the inner region. The regular misfit dislocations lead to a regular fringe pattern. In our system, as seen from the EDS line scan in Figure 4G, the chemical composition of Se and Te is gradually changed near the interface. Such broad interface results in the relatively poor periodicity of the defects, which is observed as the curvy fringes near the interface. A cool down from the hot reaction temperature to room temperature induces considerable thermodynamic volume shrinkage in the core owing to the low glass transition temperature; meanwhile, the lattices of the shell experience little change. Because the soft core is completely embedded in the shell, the volume shrinkage generates a lot of vacancies and dislocations (Figure 10). The stress in the core is volumetric rather than restricted at the interface, thereby discontinuous dislocations are expected as seen in Figure 5B.

REFERENCES AND NOTES

1. Ding, Y.; Kong, X. Y.; Wang, Z. L. Interface and Defect Structure of Zn–ZnO Core–Shell Heteronanobelts. *J. Appl. Phys.* **2004**, *95*, 306–310.
2. Lei, B.; Han, S.; Li, C.; Zhang, D.; Liu, Z.; Zhou, C. Synthesis and Electronic Properties of Transition Metal Oxide Core–Shell Nanowires. *Nanotechnology* **2007**, *18*, 044019.
3. Lei, B.; Li, C.; Zhang, D.; Hang, S.; Zhou, C. Efficient Synthesis and Electronic Studies of Core–Shell Nanowires Based on Colossal Magnetoresistive Manganites. *J. Phys. Chem. B* **2005**, *109*, 18799–18803.
4. Sun, C. W.; Jeong, J. S.; Lee, J. Y. Microstructural Analysis of ZnO/ZnS Nanocables through Moiré Fringe Induced by Overlapped Area of ZnO and ZnS. *J. Cryst. Growth* **2006**, *294*, 162–167.

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