Abstract Submitted
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Spinodal nanotechnology as a new class of bottom-up one and applications HIROSHI KATAYAMA-YOSHIDA, TETSUYA FUKUSHIMA, HIDETOSHI KIZAKI, MASAMUNE OSHITANI, KAZUNORI SATO, Graduate School of Engineering Science, Osaka Univ. — We discuss the nano-materials design of spinodal nano-decomposition as a new class of bottom-up nanotechnology by combining ab initio calculations and kinetic Monte Carlo simulations. We include all the complexity in the fabrication process of spinodal nano-decomposition (Konbu- and Dairiseki-phase) into advanced materials design with inhomogeneous materials. We compare the theoretical predictions with available experiments, such as (i)semiconductor nano-spintronics in dilute magnetic semiconductors, (ii)colossal thermoelectric-power responses of spincaloritronics, (iii)self-repaired nano-catalysis in La(Fe,Pd)O3, (iv)high-efficiency solar-cells, (v)high-efficiency light-emitting diode and Lasers. (1) K. Sato, et al., Reviews of Modern Physics, in printing (2009). (2) H. Katayama-Yoshida, et al.,Handbook of Spintronic Semiconductors, (Pan Stanford Pub.), p.1-79, (2009). (3) H. Katayama-Yoshida, et al.,Semiconductors and Semimetals, 82,433 (2008). (4) H. Katayama-Yoshida, et al.,Jpn. J. Appl. Phys. 46, L777 (2007). (5) H. Kizaki, et al.,Applied Physics Express 1, 104001, (2008).

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