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Magnetic Structure, Lattice Distortion and Phase Diagram in fcc Antiferromagnets YASUYUKI MATSUURA, TAKEO JO, ADSM, Hiroshima University — The Mn-rich alloys $\gamma Mn_{1-x}A_x$ (A=Ni, Ga, Au, Rh) is reported to exhibit the first-kind antiferromagnetic ordering. With varying the concentration of the doping element x and the temperature T, it has been confirmed experimentally to take four phases; cubic, tetragonal ($c/a < 1$), tetragonal ($c/a > 1$), and orthorhombic ones in the antiferromagnetic region [1,2]. The purpose of the present work is to explain the phase diagrams. Our Hamiltonian is composed of the polynomial of the variables describing the multiple spin density wave (MSDW), the coupling between the variables and the symmetry strain and the elastic energy. The polynomial is derived from symmetry consideration. By calculating the partition function and the free energy, we show that the phase diagram is reproduced and elucidate the structure of MSDW at each phase and the condition of the appearance of the orthorhombic phase [3]. We also discuss the effect of whether the variables are continuous or discrete on the phase diagram. [1] T. Hori, Y. Tsuchiya, S. Funahashi, Y. Shimojyo, H. Shiraishi, K. Hojyou and Y. Nakagawa: J. Magn. Magn. Mater. **196-197** (1999) 663. [2] R. Yamauchi, T. Hori, M. Miyakawa and K. Fukamichi: J. Alloys Compd. **309** (2000) 16 and references therein. [3] Y. Matsuura and T. Jo: to be published in J. Phys. Soc. Jpn. **78** No. 12 (2009).

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