# Optimization of spontaneous magnetization :
Slater-Pauling curve revisited

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One of the key factors for the advanced permanent magnet is the large spontaneous magnetization. By investigating the magnetization variation of Fe-rich multicomponent alloys, the magnetization is optimized with average valency. For binary alloys of Fe-X (X=transition-metal(TM)), the characteristic mountain-shape Slater-Pauling curve for X=3d TM elements (Fig. 1) is produced even for X=4d–5d TM elements. For ternary alloys of Fe-Si-X, the magnetization is found to repeat the Si-absent binary pattern of the Slater-Pauling curve with the shifted reference moment. We have also investigated the magnetic properties of (FeX)16N2, Fe-Y (Y=s,p metal), and Fe-RE (RE-metallic elements), and discussed the materials design of advanced permanent magnets.

data taken from Bozorth, PR 79, 887 (1950)
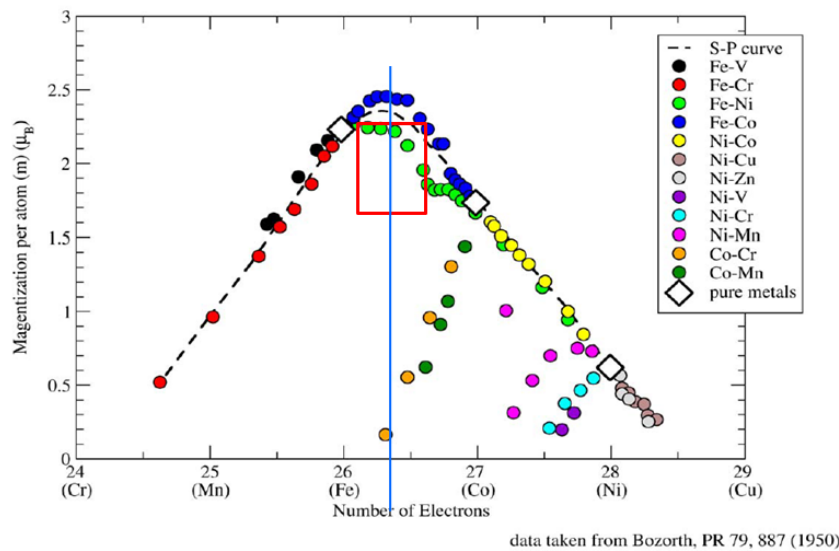
Fig. 1. Slater-Pauling curve [J. C. Slater, J. Appl. Phys. (1937) ; L. Pauling, Phys. Rev. (1938)]