

## Rare earth free exchange spring magnet: FeCo/FePt(001)

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Using the full potential linearized augmented plane wave (FLAPW) method, we have investigated the thickness dependent magnetic properties of rare earth free exchange spring magnet FeCo/FePt (001). The CoFe adlayer thickness is increased from one monolayer (ML) to four ML coverage. It is observed that the FeCo adlayers are almost half metallic. A giant magnetocrystalline anisotropy (MCA) energy is achieved in pure FePt(001) system. For instance, the calculate MCA energy per atom is about 1 meV, while it is about 2 meV per atom pure FePt(001). Under the assumption of uniform magnetization, the estimated energy product is 45.2 MGOe for CoFe 1ML, 51.4 MGOe for 2ML, 57.68 MGOe for 3ML, 49.76 MGOe for 4ML. This energy product value is comparable or larger than that of previously reported results of rare earth included materials. This may suggest that the FeCo/FePt can be utilized for potential rare earth free exchange spring magnet material.