Optimization of Leucine-Binding Nano Sized Magnetite by Two-step Transformation

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There is an increasing demand of new functional nano-sized magnetite (NSM) materials since it provides various physicochemical properties. Furthermore, NSM particles, encapsulated by certain amino acids, have promising potential for application in cancer therapy.
In this study, we synthesized Leucine-binding magnetite using Two-step Transformation. The as-synthesized NSM particles were investigated through variation of the acidity, the surface modifier, and the nature of the acid used to adjust the pH.
With increased acidity, the saturation magnetization decreased as the amount of coated Leu increased. The dicarboxyl anion (C2O42—) used as a ligand in the first step played a key role in the coating of Leu on the surfaces of the NSM particles. However, when polyethylene glycol (PEG) was used as a surface modifier, the Leu-to-NSM particle complex could not be successfully formed. As the acid used to adjust pH, H2SO4 was slightly less effective than HCl in achieving saturation magnetization because the coordination for SO42- anions is stronger than that of Cl- anions. The preparation of other amino acid-binding NSM particles can be optimized in an analogous manner.