One-Step Sintering Synthesis of Superfine $L1_0$-FePt Nanoparticles by Using *Liquid*-Assisted

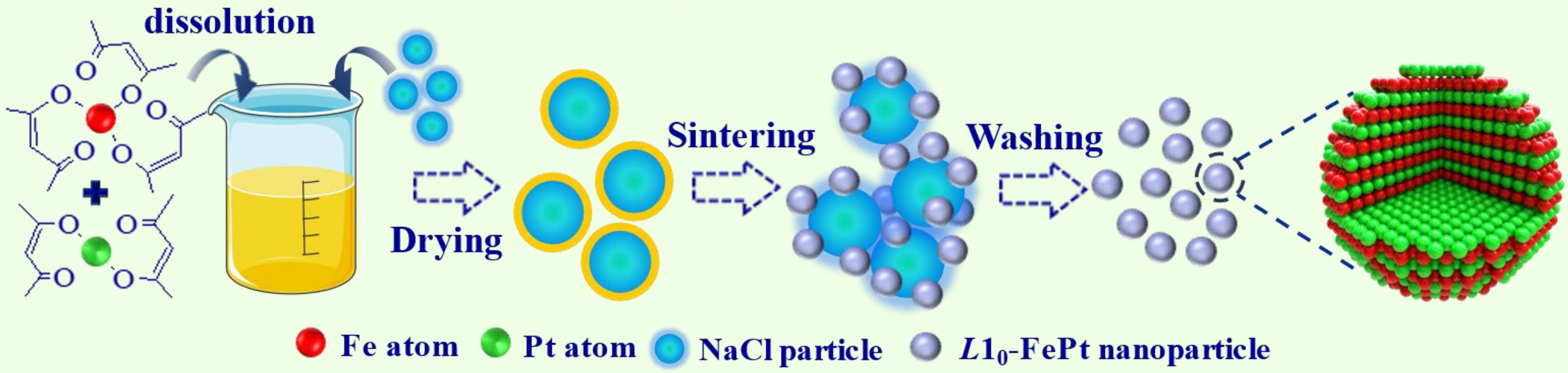
Dong Zhao[1], Wenli Pei[1,*], Chun Wu[2,*], Jianjun Wang[1], Qiang Wang[3]

1 Key Laboratory of Anisotropy and Texture of Materials (Ministry of Education), Northeastern University, Shenyang 110819, China.
2 School of Materials Science and Engineering, Liaoning Technical University, Fuxin 123000, China.
3 Key Laboratory of Electromagnetic Processing of Materials (Ministry of Education), Northeastern University, Shenyang 110819, China.

Introduction

The chemical synthesis has been become an extensive route for fabrication of FePt nanoparticles (NPs). Normally, the FePt NPs directly synthesized by chemical method are *fcc* structure. In order to obtain good performance, the particles should be transferred from *fcc* to $L1_0$ structure by a post-annealing. However, the particles would grow up and aggregate during this treatment, which seriously worsens the performance of the NPs and limits their application. To solve this bottleneck problem, many efforts have been made. SiO_2, MgO, and NaCl are employed as the protective inert layer to restrict grain growth and aggregation. However, the effects are limited and abnormal large particles and aggregation could still not avoid. How to reduce the sizes of $L1_0$-FePt NPs with higher ordering degree?

Experimental



Results and Discussions

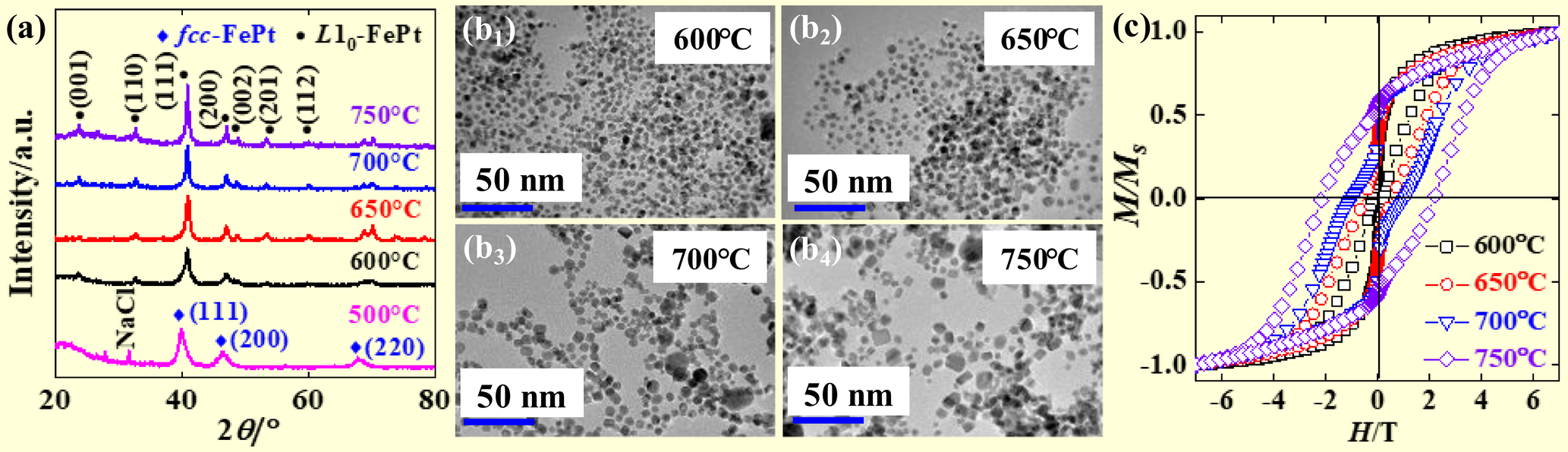


Fig. 1. XRD patterns **(a)**, TEM images **(b_1~b_4)**, and magnetic hysteresis loops **(c)** of $L1_0$-FePt NPs sintered at various temperature using weight ratio of precursors to NaCl of 1:400 (w/w).

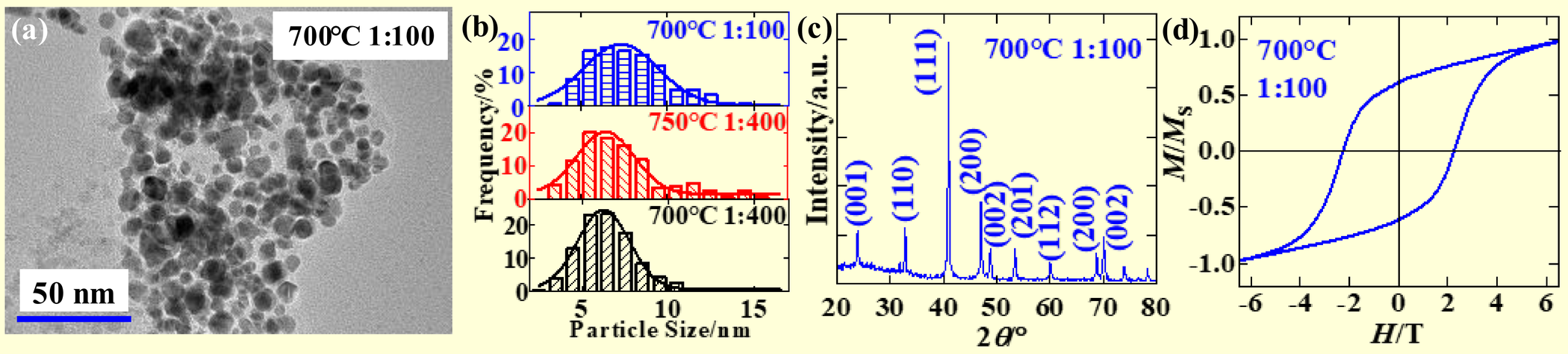


Fig. 2. TEM image **(a)**, particle distributions **(b)**, XRD pattern **(c)**, and magnetic hysteresis loop **(d)** of $L1_0$-FePt NPs.

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Contact information: Prof. 裴文利, peiwl@atm.neu.edu.cn; Dr. 吴纯, chun_wu@126.com.