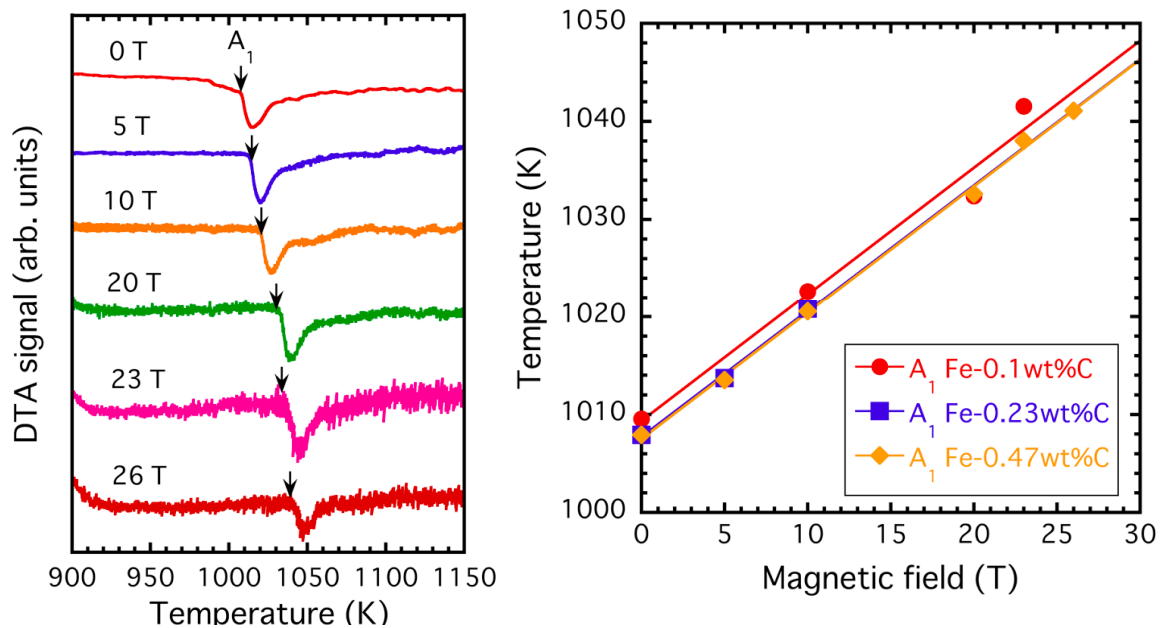


# Thermal Analysis for Fe-C Binary Alloys in High Magnetic Fields over 20 T

## Fe-C 二元合金の 20T 超強磁場中示差熱分析



Effects of high magnetic field on magnetic phase transition, chemical reaction, physical process, and solidification are studied using steady high-field (HF) magnets all over the world. In order to study these phenomena, differential thermal analysis (DTA) under high magnetic fields is one of the most important experiments. In this work, we have developed a HF-DTA apparatus that is designed for hybrid magnets with a 52 mm room temperature experimental bore. HF-DTA for Fe-C binary alloys was successful in the temperature range of 300-1370 K and in magnetic fields up to 26 T using the hybrid magnet at HFLSM. We confirmed that the eutectoid temperature  $A_1$  ( $\alpha$ -Fe + cementite  $\rightarrow$   $\alpha$ -Fe +  $\gamma$ -Fe) of the Fe-C binary increases linearly from 1008 K (at a zero field) to 1041 K by applying field of 26 T at the rate of approximately 1.3 K/T.

Dep. of Phys., Kagoshima University: K. Koyama

IMR, Tohoku University: Y. Ikehara, K. Takahashi, S. Kimura, K. Watanabe

52mm 実験ボアハイブリッドマグネットを用いて実験可能な強磁場下示差熱分析装置を開発した。炭素鋼 Fe-C について、最高磁場 26T 中最高温度 1370K までの炭素鋼 Fe-C の熱分析に成功した。その結果、共析温度  $A_1$  点 ( $\alpha$ -Fe + セメンタイト  $\rightarrow$   $\alpha$ -Fe +  $\gamma$ -Fe) が磁場に比例して、1.3 K/T の割合で増加することが実験的に明らかとなった。

鹿児島大学理学部：小山佳一

東北大学金属材料研究所：池原 佑基, 高橋 弘紀, 木村尚次郎, 渡辺和雄