

Supplementary Information

# **Magnetic-Property Assessment on Dy–Nd–Fe–B Permanent Magnet by Thermodynamic Calculation and Micromagnetic Simulation**

**Zhiming Dai <sup>1,2</sup>, Kai Li <sup>1,3</sup>, Zhenhua Wang <sup>1,\*</sup>, Wei Liu <sup>1</sup> and Zhidong Zhang <sup>1</sup>**

<sup>1</sup> Shenyang National Laboratory for Materials Science, Institute of Metal Research, Chinese Academy of Sciences, Shenyang 110016, China

<sup>2</sup> Jiangsu Key Laboratory of Modern Measurement Technology and Intelligent Systems, Department of Physics, Huaiyin Normal University, Huai'an 223300, China

<sup>3</sup> School of Materials Science and Engineering, University of Science and Technology of China, Hefei 230026, China

\* Correspondence: zhwang@imr.ac.cn; Fax: +86-24-23891320

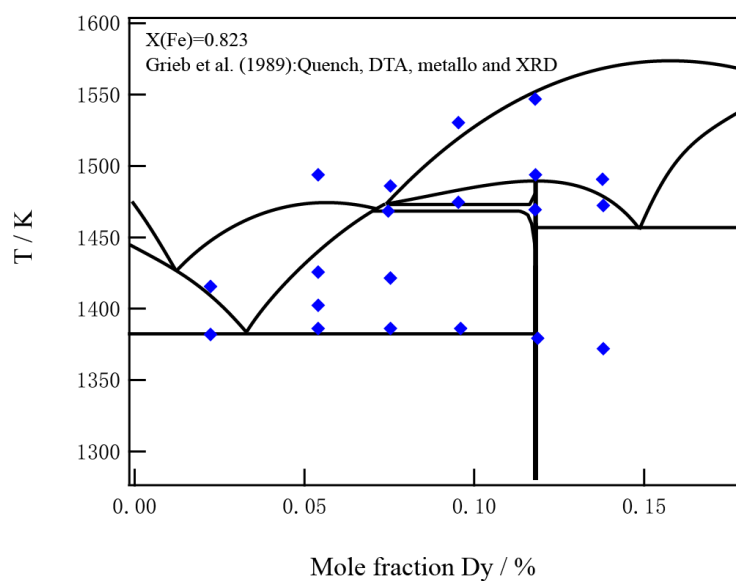


Figure S1. Calculated vertical section for Dy-Fe-B system at 82.3 at% Fe with the experimental data [21].

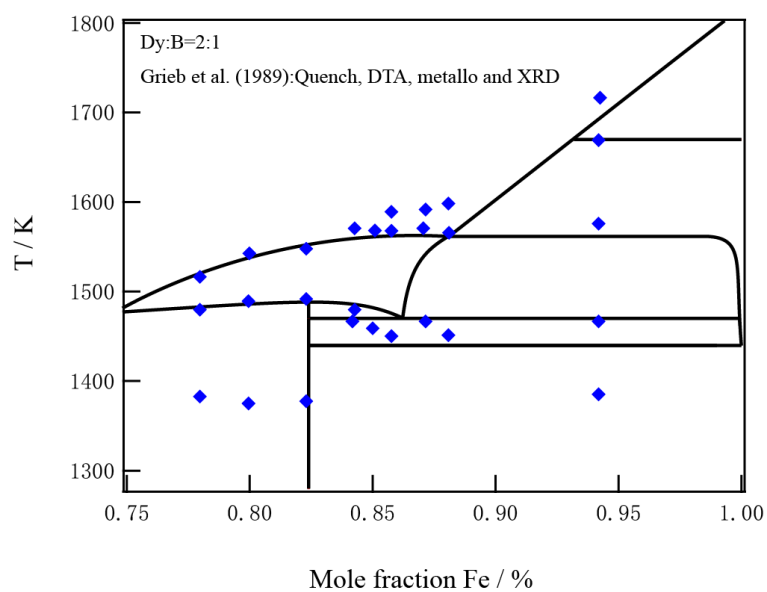


Figure S2. Calculated vertical section for Dy-Fe-B system at Dy:B=2:1 with the experimental data [21].

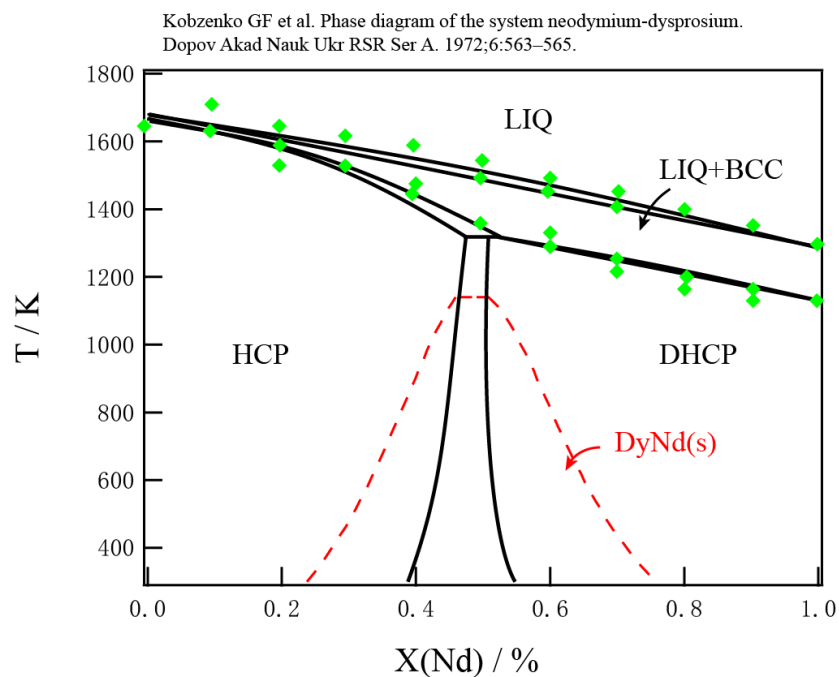


Figure S3. Calculated Nd-Dy binary system with the experimental data [22]. The red dashed line denotes the DyNd stoichiometric compound.

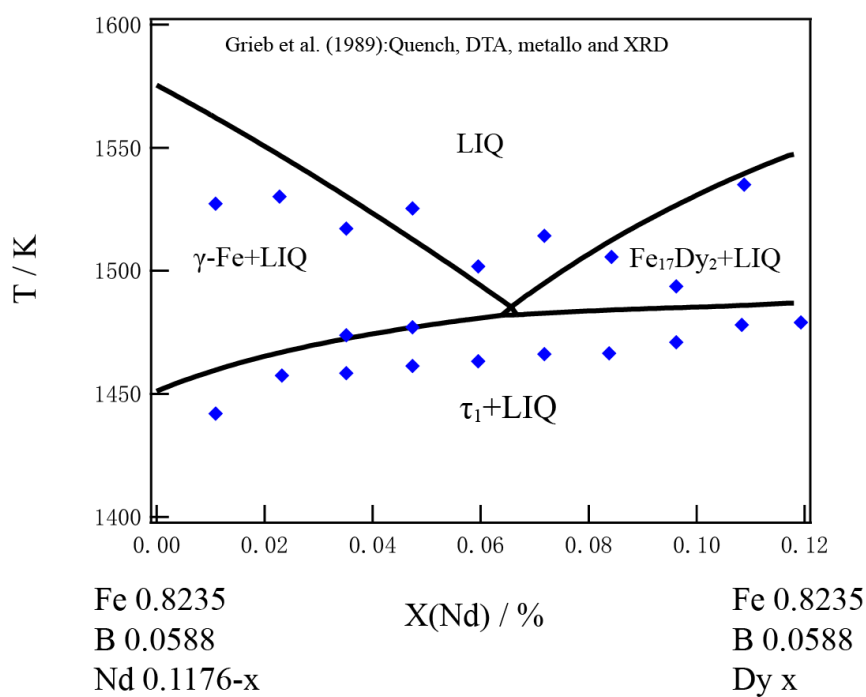


Figure S4. Calculated section of  $\text{Nd}_2\text{Fe}_{14}\text{B}$ – $\text{Dy}_2\text{Fe}_{14}\text{B}$  with the experimental data [21].

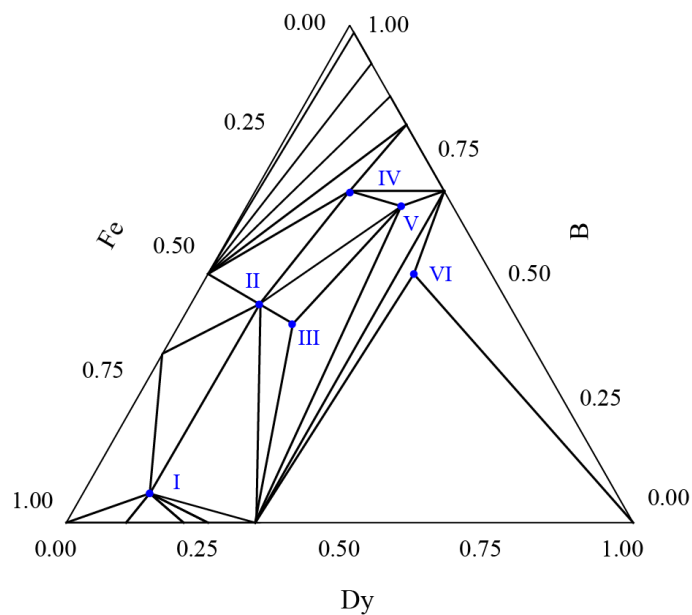


Figure S5. Calculated isothermal section of the Dy-Fe-B ternary system at 1073 K.

I-VI denote  $\text{Dy}_2\text{Fe}_{14}\text{B}$ ,  $\text{Dy}_{1.1}\text{Fe}_4\text{B}_4$ ,  $\text{DyFe}_2\text{B}_2$ ,  $\text{DyFeB}_4$ ,  $\text{Dy}_3\text{FeB}_7$ , and  $\text{Dy}_2\text{FeB}_3$ , respectively. The thermodynamic data of  $\text{DyFe}_2\text{B}_2$ ,  $\text{DyFeB}_4$ ,  $\text{Dy}_3\text{FeB}_7$ , and  $\text{Dy}_2\text{FeB}_3$  stoichiometric phases are not shown in this work for the melting points are absent.

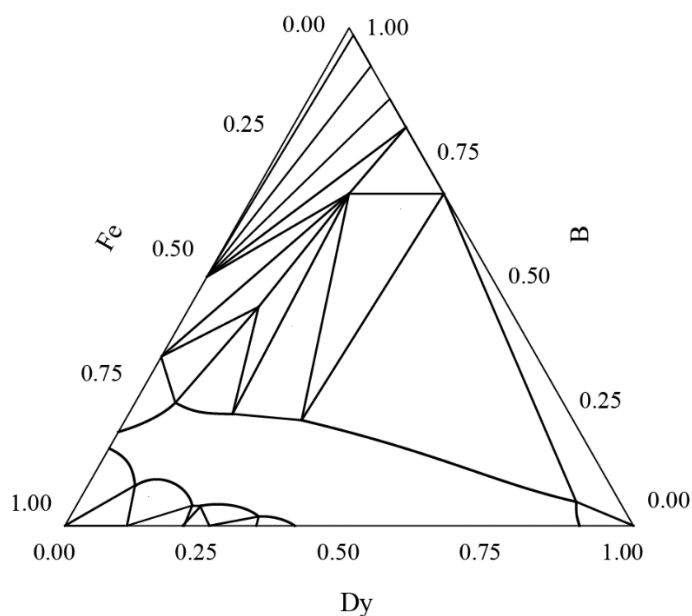


Figure S6. Calculated isothermal section of the Dy-Fe-B ternary system at 1500 K.

## References

- [21] B. Grieb, G. Schneider, E. T. Henig and G. Petzow, Structural investigations and constitution along  $\text{Fe}_{14}(\text{Nd}_{1-x}(\text{Tb or Dy})_x)_2\text{B}$ , *Z. Metallkd*, 80 (1989) 515–519.
- [22] G.F. Kobzenko, V.N. Svechnikov, E.L. Matrynychuk, Phase diagram of the system neodymium-dysprosium. *Dopov Akad Nauk Ukr RSR Ser A*. 6 (1972) 563–565.