Reply to "Comment on 'Unconventional enhancement of ferromagnetic interactions in Cd-doped $GdFe_2Zn_{20}$ single crystals studied by ESR and ^{57}Fe Mössbauer spectroscopies' "

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(Received 8 April 2021; revised 4 May 2021; accepted 13 May 2021; published 25 May 2021)

The RT_2Zn_{20} family offers an incredible versatility to tune diverse ground states through small modifications of their composition. In our recent publication [Phys. Rev. B **102**, 144420 (2020)] we have reported an enhancement of the FM transition temperature due to negative chemical pressure from 86 to 96 K for $x = 0.0$ and $x = 1.4$, respectively, with an also unexpected, however, suspicious reduction of the effective and saturation magnetic moment that was inconsistent with our ESR data [Phys. Rev. B **102**, 144420 (2020)]. In a comment of our work by Canfield (preceding paper [Phys. Rev. B **103**, 176401 (2021)]), they have confirmed our finding about the enhancement of the FM temperature, however, with appreciable differences in the $M(H)$ and $M(T)$ curves for the Cd doped samples. We agree with their analysis of the magnetization data, the saturation of those samples is between $6\,\mu_B$ and $7\,\mu_B$ instead of $4\,\mu_B$ as we have reported. It is indeed likely that we have used a mass value of the measured samples that includes Cd-doped $GdFe_2Zn_{20}$ and a second-phase contamination of the non-magnetic Zn flux (please observe the XRD data in the original paper [Phys. Rev. B **102**, 144420 (2020)]). Therefore, we agree with the comment by Canfield *et al.* (preceding paper [Phys. Rev. B **103**, 176401 (2021)]) about the thorough analysis of the $M(T)$ and $M(H)$ for the Cd-doped samples (Fig. 2 of their Comment). The erratum clarifies and corrects [Phys. Rev. B **103**, 179903(E) (2021)].

DOI: 10.1103/PhysRevB.103.176402

We also agree with their Comment about an identical magnetic hyperfine field at zero temperature measured in our ^{57}Fe Mössbauer experiments for the $x = 0$ and $x = 1.4$ samples, consistent with identical saturated magnetic moments.

We would like to mention that the increase in T_C by the addition of Cd was the challenging motivation for us. This is because the usual Ruderman-Kittel-Kasuya-Yosida formalism would predict a reduction of T_C as the Gd-Gd distance increases (see Refs. [1–3]). Since the ESR and Mössbauer experiments are microscopic and local measurements, their results do not depend on the mass of the samples as the magnetization technique does, and we would like to emphasize the importance of our results obtained with these two spectroscopies. That is, the increase in T_C may be associated with the reconstruction of the Fermi surface and/or a new distribution of the d type of conduction electrons despite the negative chemical pressure.

[1] M. Cabrera-Baez, J. Munevar, R. M. Couto-Mota, Y. M. Camejo, C. Contreras, E. Baggio-Saitovitch, M. A. Avila, and C. Rettori, Phys. Rev. B **102**, 144420 (2020).

[2] P. C. Canfield *et al.*, preceding paper, Phys. Rev. B **103**, 176401 (2021).

[3] M. Cabrera-Baez *et al.*, Phys. Rev. B **103**, 179903(E) (2021).

