

# Inducing Magnetic Properties with Ferrite Nanoparticles in Resins for Additive Manufacturing

Rocío Redón <sup>1,\*</sup>, Miriam D. Aviles-Avila <sup>1</sup>, Leopoldo Ruiz-Huerta <sup>1,2</sup>, Herlinda Montiel <sup>1</sup>,  
Alex Elías-Zúñiga <sup>2,3</sup>, Lucy-Caterine Daza-Gómez<sup>1</sup> and Oscar Martínez-Romero <sup>2,3</sup>

<sup>1</sup> Instituto de Ciencias Aplicadas y Tecnología, Universidad Nacional Autónoma de México, Cd. Universitaria, Coyoacán, Mexico City 04510, Mexico; leorui@unam.mx (L.R.-H.);

<sup>2</sup> National Laboratory for Additive and Digital Manufacturing (MADiT), Universidad Nacional Autónoma de México, Mexico City 04510, Mexico; oscar.martinez@tec.mx (O.M.-R.)

<sup>3</sup> Department of Mechanical Engineering and Advanced Materials, Institute of Advanced Materials for Sustainable Manufacturing, Tecnológico de Monterrey, Av. Eugenio Garza Sada Sur 2501, Monterrey 64849, Mexico

\* Correspondence: rredon@unam.mx; Tel.: +52-5556228602 (ext. 1207)

**Table S1.** w/w % of the mechanochemical reactions between nanoparticles of barium ferrite ( $\text{BaFe}_{12}\text{O}_{19}$ ) - Resin IRIX White and, between nanoparticles of cobalt ferrite ( $\text{CoFe}_2\text{O}_4$ ) - Resin IRIX White.

| Sample name     | Sample content  | Nanoparticles percentage [w/w %] |
|-----------------|---|----------------------------------|
| A <sub>0</sub>  | Resin IRIX White  | 0                                |
| A <sub>1</sub>  | BaFe <sub>12</sub> O <sub>19</sub> and IRIX White resin | 0.1                              |
| A <sub>3</sub>  | BaFe <sub>12</sub> O <sub>19</sub> and IRIX White resin | 0.3                              |
| A <sub>5</sub>  | BaFe <sub>12</sub> O <sub>19</sub> and IRIX White resin | 0.5                              |
| A <sub>7</sub>  | BaFe <sub>12</sub> O <sub>19</sub> and IRIX White resin | 0.7                              |
| A <sub>10</sub> | BaFe <sub>12</sub> O <sub>19</sub> and IRIX White resin | 1.0                              |
| B <sub>1</sub>  | CoFe <sub>2</sub> O <sub>4</sub> and IRIX White resin   | 0.1                              |
| B <sub>3</sub>  | CoFe <sub>2</sub> O <sub>4</sub> and IRIX White resin   | 0.3                              |
| B <sub>5</sub>  | CoFe <sub>2</sub> O <sub>4</sub> and IRIX White resin   | 0.5                              |
| B <sub>7</sub>  | CoFe <sub>2</sub> O <sub>4</sub> and IRIX White resin   | 0.7                              |
| B <sub>10</sub> | CoFe <sub>2</sub> O <sub>4</sub> and IRIX White resin   | 1.0                              |

**Table S2.** Percentages w%/w% of the mechanochemical reactions between nanoparticles of barium ferrite ( $\text{BaFe}_{12}\text{O}_{19}$ ) - Resin Anycubic Green and, between nanoparticles of cobalt ferrite ( $\text{CoFe}_2\text{O}_4$ ) - Resin Anycubic Green.

| Sample name     | Sample content   | Nanoparticles percentage [w%/w%] |
|-----------------|--|----------------------------------|
| C <sub>0</sub>  | Resin Anycubic Green                                     | 0                                |
| C <sub>1</sub>  | $\text{BaFe}_{12}\text{O}_{19}$ and Anycubic Green resin | 0.1                              |
| C <sub>3</sub>  | $\text{BaFe}_{12}\text{O}_{19}$ and Anycubic Green resin | 0.3                              |
| C <sub>5</sub>  | $\text{BaFe}_{12}\text{O}_{19}$ and Anycubic Green resin | 0.5                              |
| C <sub>7</sub>  | $\text{BaFe}_{12}\text{O}_{19}$ and Anycubic Green resin | 0.7                              |
| C <sub>10</sub> | $\text{BaFe}_{12}\text{O}_{19}$ and Anycubic Green resin | 1.0                              |
| C <sub>20</sub> | $\text{BaFe}_{12}\text{O}_{19}$ and Anycubic Green resin | 2.0                              |
| C <sub>30</sub> | $\text{BaFe}_{12}\text{O}_{19}$ and Anycubic Green resin | 3.0                              |
| C <sub>40</sub> | $\text{BaFe}_{12}\text{O}_{19}$ and Anycubic Green resin | 4.0                              |
| C <sub>50</sub> | $\text{BaFe}_{12}\text{O}_{19}$ and Anycubic Green resin | 5.0                              |
| C <sub>60</sub> | $\text{BaFe}_{12}\text{O}_{19}$ and Anycubic Green resin | 6.0                              |
| D <sub>1</sub>  | $\text{CoFe}_2\text{O}_4$ and Anycubic Green resin       | 0.1                              |
| D <sub>3</sub>  | $\text{CoFe}_2\text{O}_4$ and Anycubic Green resin       | 0.3                              |
| D <sub>5</sub>  | $\text{CoFe}_2\text{O}_4$ and Anycubic Green resin       | 0.5                              |
| D <sub>7</sub>  | $\text{CoFe}_2\text{O}_4$ and Anycubic Green resin       | 0.7                              |
| D <sub>10</sub> | $\text{CoFe}_2\text{O}_4$ and Anycubic Green resin       | 1.0                              |
| D <sub>20</sub> | $\text{CoFe}_2\text{O}_4$ and Anycubic Green resin       | 2.0                              |
| D <sub>30</sub> | $\text{CoFe}_2\text{O}_4$ and Anycubic Green resin       | 3.0                              |
| D <sub>40</sub> | $\text{CoFe}_2\text{O}_4$ and Anycubic Green resin       | 4.0                              |