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## Magnetic Properties of CoFe<sub>2</sub>O<sub>4</sub>/CoFe<sub>2</sub> nanocomposites reduced by activated charcoal in argon atmosphere

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### Abstract content <br> &nbsp; (Max 300 words)

The core-shell architecture of CoFe<sub>2</sub>O<sub>4</sub>/CoFe<sub>2</sub> nanocomposites was synthesized in a controlled-argon atmosphere by reduction reaction process with activated charcoal at 900 °C. The parent sample (CoFe<sub>2</sub>O<sub>4</sub>) was synthesized at 200 °C by glycol-thermal method which was followed by its subsequent partial and full reductions to CoFe<sub>2</sub>. Full reduction was achieved at a molar ratio of CoFe<sub>2</sub>O<sub>4</sub> to C at 1:8. The phase identification and magnetic properties of the parent sample and nanocomposites were performed by X-ray diffraction, <sup>57</sup>Fe Mössbauer spectroscopy and vibrating sample magnetometer. The average crystallite size of the parent sample changed from about 10 nm to about 60 nm after calcination at 900°C. A reduction in coercive field was observed from 337 Oe to about 20 Oe after activation by charcoal. The nanocomposites show enhanced magnetizations with increased carbon or CoFe<sub>2</sub> content. The reduction process appears to increase the energy product from 0.86 MGOe for the annealed parent sample to 1.39 MGOe for the fully reduced sample.

### Apply to be<br> considered for a student <br> &nbsp; award (Yes / No)?

Yes

### Level for award<br>&nbsp;(Hons, MSc, <br> &nbsp; PhD)?

Msc

### Would you like to <br> submit a short paper <br> for the Conference <br> Proceedings (Yes / No)?

Yes

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