ABSTRAK

Permasalahan e*lectromagnetic interference* (EMI) dapat dikontrol dengan teknologi penyerapan gelombang elektromagnetik. Penelitian ini bertujuan membuat material penyerap gelombang mikro berbasis barium ferit doping biosilika dengan variasi konsentrasi 0, 10, 20, dan 30 dalam satuan *weight*% menggunakan metode *modified solid state reaction*. Metode *modified solid state reaction* merupakan gabungan dari metode *novel water asissted* dan metode *solid state reaction*. Penambahan doping biosilika terbukti mempengaruhi struktur kristal, sifat magnetik dan ukuran kristal material SiBaFe. Terbentuk sembilan fasa yaitu, *Barioferrite* ($Ba_2Fe_{24}O_{38}$), *Iron Oxide* (Fe_2O_3), *Barrium Ferrite* ($Ba_{28}Fe_{28}O_{90}$), $Fe_{192}O_{240}$, *Gillespite* ($Ba_4Fe_4Si_{16}O_{40}$), $O_{138}Ba_6Fe_{90}$, Si_4O_8, Si_8O_{16} dan $Si_{96}O_{192}$. Ukuran kristal SiBaFe bervariasi berkisar 59,96 – 92,76 nm. Sampel SiBaFe0 termasuk material paramagnetik sedangkan untuk sampel SiBaFe1, SiBaFe2, dan SiBaFe3 termasuk material superparamagnetik. Selain itu berdasarkan kurva histerisis material SiBaFe ini termasuk bahan *softmagnetic.* Sampel SiBaFe1 dengan konsentrasi doping 10 *weight*% memiliki kemampuan penyerap gelombang mikro terbaik dengan daya serap 100% dan nilai *reflection loss* sebesar -72,36 dB.

Kata kunci: barium ferit, biosilika, *modified solid state reaction*, penyerap gelombang mikro

ABSTRACT

Electromagnetic wave absorption technology can be used to control electromagnetic interference (EMI). Using the modified solid state reaction method, this research aims to create a microwave absorption material based on barium ferrite biosilica doped with a concentration variation of 0, 10, 20, and 30% in weight%. The novel water assisted method and the solid state reaction method have been combined to create the modified solid state reaction method. The addition of biosilica doping to SiBaFe material has been shown to change the crystal structure, magnetic characteristics, and crystal size. Nine phases were formed, namely, Barioferrite ($Ba_2Fe_{24}O_{38}$), Iron Oxide (Fe_2O_3), Barrium Ferrite ($Ba_{28}Fe_{28}O_{90}$), $Fe_{192}O_{240}$, Gillespite ($Ba_4Fe_4Si_{16}O_{40}$), $O_{138}Ba_6Fe_{90}$, Si_4O_8, Si_8O_{16} and $Si_{96}O_{192}$. The size of SiBaFe crystals ranges from 59.96 to 92.76 nm. SiBaFe0 materials are paramagnetic, but SiBaFe1, SiBaFe2, and SiBaFe3 materials are superparamagnetic. Furthermore, the hysteresis curve indicates that the SiBaFe materials is a softmagnetic material. With 100% absorption and a reflection loss value of -72.36 dB, the SiBaFe1 sample with a doping concentration of 10 weight% has the best microwave absorption performance.

Keywords: *barium ferrite, biosilica, modified solid state reaction, microwave absorption*