

## DAFTAR ISI

|   |             |
|---|-------------|
| <b>HALAMAN JUDUL .....</b>  | <b>i</b>    |
| <b>HALAMAN PENGESAHAN .....</b>   | <b>iii</b>  |
| <b>HALAMAN PERNYATAAN .....</b>   | <b>iv</b>   |
| <b>HALAMAN PERNYATAAN BEBAS PLAGIASI .....</b>  | <b>v</b>    |
| <b>HALAMAN MOTTO DAN PERSEMBAHAN .....</b>  | <b>vi</b>   |
| <b>HALAMAN PRAKATA .....</b>  | <b>vii</b>  |
| <b>DAFTAR ISI .....</b>   | <b>ix</b>   |
| <b>DAFTAR GAMBAR .....</b>  | <b>xi</b>   |
| <b>DAFTAR TABEL .....</b>   | <b>xiii</b> |
| <b>INTISARI .....</b>   | <b>xiv</b>  |
| <b>ABSTRACT ..</b>  | <b>xv</b>   |
| <br>  |             |
| <b>BAB I. PENDAHULUAN .....</b>   | <b>1</b>    |
| 1.1 Latar Belakang .....  | 1           |
| 1.2 Rumusan Masalah .....   | 4           |
| 1.3 Batasan Masalah .....   | 4           |
| 1.4 Tujuan Penelitian .....   | 4           |
| 1.5 Manfaat Penelitian .....  | 4           |
| 1.6 Sistematika Penulisan .....   | 5           |
| <br>  |             |
| <b>BAB II. TINJAUAN PUSTAKA .....</b>   | <b>6</b>    |
| <br>  |             |
| <b>BAB III. LANDASAN TEORI.....</b>   | <b>11</b>   |
| 3.1 Terminologi Kemagnetan Material .....   | 11          |
| 3.2 Fonon dan Vibrasi pada Atom .....   | 13          |
| 3.2.1 Vibrasi Kisi Diatomik Satu Dimensi.....   | 13          |
| 3.2.2 Fonon.....  | 16          |
| 3.3 Nanopartikel Cobalt Ferrite ( $\text{CoFe}_2\text{O}_4$ ).....  | 19          |
| 3.4 Material Seng Oksida ( $\text{ZnO}$ ) .....   | 21          |
| 3.5 Metode Kopresipitasi .....  | 22          |
| 3.6 <i>Infrared Spectroscopy</i> (Spektroskopi IR) .....  | 23          |
| 3.7 Karakterisasi Material .....  | 27          |
| 3.7.1 <i>X-ray diffraction</i> (XRD).....   | 27          |
| 3.7.2 <i>Transmission electron microscopy</i> (TEM) .....   | 29          |
| 3.7.3 <i>Fourier Transform Infrared Spectroscopy</i> (FTIR) .....   | 30          |
| <br>  |             |
| <b>BAB IV. METODE PENELITIAN .....</b>  | <b>32</b>   |
| 4.1 Waktu dan Tempat Penelitian .....   | 32          |
| 4.2 Alat dan Bahan.....   | 32          |
| 4.2.1 Alat.....   | 32          |
| 4.2.2 Bahan ... ..  | 33          |
| 4.3 Prosedur Penelitian.....  | 34          |
| 4.3.1 Persiapan Alat dan Bahan .....  | 34          |
| 4.3.2 Sintesis nanopartikel magnetik $\text{CoFe}_2\text{O}_4$ metode kopresipitasi .....                       | 34          |
| 4.3.3 Sintesis Nanopartikel magnetik <i>core-shell</i> $\text{CoFe}_2\text{O}_4@ZnO$ Metode Kopresipitasi ..... | 35          |

|   |           |
|---|-----------|
| 4.4 Metode Analisa Data.....  | 38        |
| 4.4.1 Karakterisasi dengan <i>X-Ray Diffraction</i> (XRD) .....   | 38        |
| 4.4.2 Karakterisasi dengan <i>Transmission Electron Microscope</i> (TEM)<br>.....                               | 38        |
| 4.4.3 Karakteristik dengan <i>Fourier Transform Infrared Spectroscopy</i><br>(FTIR) ...                         | 39        |
| <b>BAB V. HASIL DAN PEMBAHASAN .....</b>  | <b>41</b> |
| 5.1 Hasil Sintesis Nanopartikel Magnetik <i>core-shell</i> $\text{CoFe}_2\text{O}_4@ZnO$ .....                  | 41        |
| 5.2 Karakterisasi Nanopartikel Magnetik $\text{CoFe}_2\text{O}_4@ZnO$ ( <i>core-shell</i> )<br>dengan XRD ..... | 41        |
| 5.3 Karakterisasi Nanopartikel Magnetik $\text{CoFe}_2\text{O}_4@ZnO$ ( <i>core-shell</i> )<br>dengan TEM.....  | 45        |
| 5.4 Karakterisasi Nanopartikel Magnetik $\text{CoFe}_2\text{O}_4@ZnO$ ( <i>core-shell</i> )<br>dengan FTIR..... | 47        |
| <b>BAB VI. KESIMPULAN DAN SARAN.....</b>  | <b>52</b> |
| 6.1 Kesimpulan .....  | 52        |
| 6.2 Saran.....  | 52        |
| <b>DAFTAR PUSTAKA .....</b>   | <b>53</b> |
| <b>LAMPIRAN A.....</b>  | <b>56</b> |
| <b>LAMPIRAN B .....</b>   | <b>59</b> |
| <b>LAMPIRAN C.....</b>  | <b>60</b> |