

DAFTAR ISI

| | |
|--|-------|
| HALAMAN PENGESAHAN | iii |
| PERNYATAAN BEBAS PLAGIASI | iv |
| NASKAH SOAL TUGAS AKHIR | v |
| HALAMAN PERSEMBAHAN | vi |
| KATA PENGANTAR | vii |
| DAFTAR ISI | ix |
| DAFTAR GAMBAR | xi |
| DAFTAR TABEL | xiii |
| DAFTAR LAMPIRAN | xiv |
| DAFTAR NOTASI DAN SINGKATAN | xv |
| INTISARI | xvii |
| <i>ABSTRACT</i> | xviii |
| BAB I PENDAHULUAN | 1 |
| 1.1 Pendahuluan | 1 |
| 1.2. Rumusan Masalah | 3 |
| 1.3 Batasan Masalah | 3 |
| 1.4 Tujuan Penelitian | 4 |
| 1.5 Manfaat Penelitian | 4 |
| BAB II TINAJUAN PUSTAKA | 5 |
| 2.1 Ekstrusi Filamen 3D <i>Printing</i> | 5 |
| 2.2. Keamanan <i>Polyethylene Glycol</i> (PEG) dan <i>Paraffin Oil</i> (PO) | 9 |
| 2.3 <i>Fused Deposition Modeling</i> Filamen UHMWPE | 10 |
| 2.4 Keterbaruan Penelitian | 15 |
| BAB III DASAR TEORI | 16 |
| 3.1. <i>Ultra-High Molecular Weight Polyethylene</i> (UHMWPE) | 16 |
| 3.2. Proses Ekstrusi Plastik | 18 |
| 3.3. <i>Single Screw Extrusion</i> | 19 |
| 3.4. <i>Additive Manufacture</i> | 21 |
| 3.5. <i>Fused Deposition Modeling</i> (FDM) | 23 |
| 3.7. Prinsip Dasar Mesin 3D <i>Printer</i> | 27 |

| | | |
|-----------------------|--|-----------|
| 3.8. | Material Filamen 3D Printer | 27 |
| 3.9. | Differential Scanning Calorimetry (DSC) | 28 |
| 3.10. | Fourier Transform Infrared Spectroscopy (FTIR) | 30 |
| 3.11 | Scanning Electron Microscope (SEM) | 31 |
| BAB IV | METODE PENELITIAN | 33 |
| 4.1 | Alat Penelitian | 33 |
| 4.2 | Bahan Penelitian | 38 |
| 4.3 | Prosedur Penelitian | 42 |
| 4.4 | Kesulitan yang Dihadapi | 48 |
| 4.5 | Variabel Penelitian | 48 |
| 4.6 | Pengujian dan Karakterisasi | 49 |
| 4.6.1 | Uji Differential Scanning Calorimetry (DSC) | 49 |
| 4.6.2 | Uji Fourier Transform Infrared Spectroscopy (FTIR) | 50 |
| 4.6.3 | Uji Scanning Electron Microscope (SEM) | 50 |
| BAB V | HASIL DAN PEMBAHASAN | 51 |
| 5.1 | Diameter Filamen UHMWPE | 51 |
| 5.2 | Proses 3D Printing Fused Deposition Modeling (FDM) | 55 |
| 5.3 | Permukaan Filamen dan Sampel 3D printed UHMWPE | 59 |
| 5.4 | Hasil Karakterisasi dengan DSC | 62 |
| 5.5 | Hasil Karakterisasi dengan FTIR | 66 |
| BAB VI | KESIMPULAN DAN SARAN | 70 |
| 6.1 | Kesimpulan | 70 |
| 6.2 | Saran | 70 |
| DAFTAR PUSTAKA | | 71 |
| LAMPIRAN | | 79 |