

Executive Summary:

- We have demonstrated scale-up of our previously developed laboratory-scale technology for the preparation of 3D printing filament based on waste-derived high density polyethylene (HDPE). This scaled up process is robust and can be implemented in resource constrained settings such as a garbage collection site.
- We have demonstrated a laboratory scale technology for the preparation of 3D printable isotactic polypropylene filaments, and have determined the key mechanisms for warpage.
- A 3D printer has been installed at IIT-Bombay and preliminary experiments have been performed to investigate the freezing of an aqueous jet impinged into cold organic substrate.
- A key challenge is the rapid break-up of this jet into drops through the surface tension driven Rayleigh instability. Therefore, we have initiated experiments and simulations to investigate the behaviour of aqueous jets extruded into organic matrices, specifically focusing on yield stress matrices and cold matrices, such that the aqueous jet can freeze.