

# Bulk metallic glass coating of polymer substrates

Erno Soinila <sup>a,\*</sup>, Parmanand Sharma <sup>b</sup>, Akihisa Inoue <sup>b</sup> and Hannu Hänninen <sup>a</sup>

<sup>a</sup> Laboratory of Engineering Materials, Helsinki University of Technology, Espoo, Finland.

<sup>b</sup> Institute for Materials Research, Tohoku University, Sendai, 980-8577, Japan.

\* Corresponding author. Email: Erno.Soinila@tkk.fi. The work was done in part while in exchange at the Institute for Materials Research, Tohoku University, Sendai, 980-8577, Japan.

## Abstract

Bulk Metallic Glass (BMG) alloy films were deposited by sputtering on polycarbonate (PC), polymethyl methacrylate (PMMA), polyacrylamide (PAA+50GF) with 50 % glass fiber reinforcement, polyphenylene sulfide (PPS+30GF) with 30 % glass fiber reinforcement, poly(tetrafluoroethylene) (PTFE), polybutylene terephthalate (PBT+30GF) with 30 % glass fiber reinforcement and on polyamide (PA12) substrates. Film adhesion to the substrates was tested with tape testing. The compositions of the deposited materials were studied with FEG-SEM and by EDS. The structure of the coatings was measured with XRD and compared to a cast specimen of the target composition. The successful coating achieving adequate adhesion between PAA+50GF, PPS+30GF, PTFE, PBT+30GF and PA12 substrates and  $Zr_{55}Cu_{30}Al_{10}Ni_5$  alloy is seen beneficial for BMG-alloys in future applications. The residual stresses of deposited BMG coatings still need further study.