CHAPTER VII
CONCLUSIONS AND RECOMMENDATIONS

The 0-3 connectivity Air/PVDF composites were successfully fabricated from phase inversion and chemical blowing agent process at different % porosity, structure, and shape of bubbles in PVDF matrix. The morphology from phase inversion can be classified into cellular (DMAc, DMF) and sponge-like (TEP) structures. For the non-cellular regular spherical bubble shape of PVDF films were produced by azodicabonamide (AZDC). The thermal behaviors result show that internal bubble dues not affect on a decomposition temperature (T_d) and a stretching PVDF film (ellipsoidal shape) has no effect on melting temperature (T_m) but stretching are slightly effects on β-phase crystallinity of PVDF film. The dielectric constant of PVDF films with spherical bubbles shape show higher relaxation effect and show high loss at high frequency. On the other hand, the ellipsoid bubble shape shows more promising data including higher dielectric constant and lower loss tangent than spherical shape. Moreover, dielectric properties of non-cellular (blowing agent) were higher than those of the cellular structure (from phase inversion). Also, Yamada model could fit well for all air bubbles shape composites indicating 0-3 connectivity which linearly decreased with increasing the amount of air. The piezoelectric coefficient of ellipsoidal bubbles shape in porous PVDF film can enhance a piezoelectric up to 7 pC/N which higher than spherical shape. These values are slightly more than some PVDF/inorganic piezoelectric composites. These induced internal bubbles in PVDF films are very promising for piezoelectric lightweight applications, for example, in hydrophone and under water applications.

Recommendations

The carbon and graphite should be added into PVDF/air composites for reduced charge concentration on bubbles and material can be poled at higher E- field.

The poling machine does not have enough electric field to poling PVDF, so the sample for poling should be very thin.