Abstract: In the present work, the development of cellular films by stretching isotactic polypropylene (i-PP) filled with NA11 (2,2’-methylene-bis-(4,6-di-tert-butylphenyl)-phosphate) particles and hollow glass spheres is reported. Morphology, electret properties and piezoelectric activity are investigated. An enhancement of the charge storage stability for the cellular films is due to the formation of cavities, which retard the drift of charges through the volume of the film. Furthermore, the cellular stretched i-PP films with hollow glass spheres were made piezoelectric by suitable corona poling method. Films were stretched to draw ratios of 3.5:3.5 (medium stretched) and selected samples were drawn to ratios of 5:5 (highly stretched). The applied draw ratio was found to directly influence the cavity formations and by this the electret and piezoelectric properties. Excellent electret properties were obtained in the case of highly stretched i-PP films containing 10 wt% of NA11, known as a nucleating agent additive for i-PP. Additionally, piezoelectric activity \( (d_{33}=179 \ \text{pC/N}) \) was observed in these films. i-PP films with glass spheres showed piezoelectric coefficients between 17 and 170 pC/N, depending on glass sphere size and concentration as well as on draw ratio.