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Mechanical Properties of Polycaprolactone Porous Samples

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Polycaprolactone, PCL, is a biocompatible and reabsorbable semicrystalline polymer, proposed for a wide variety of biomedical applications. The mechanical properties of PCL scaffolds prepared by phase separation from dissolution of PCL in Tetrahydrofurane, THF, were studied. There were two different sets of samples: a) films obtained by evaporation of THF at room temperature, which produces films with a porosity of around 20 %; b) sponges obtained by cooling the solution at -30°C , which then converts to a gel, subsequently eliminating the solvent by freeze drying. This process produces a very porous crystalline structure. The porosity of the sponges ranges between 50–70%. The crystallinity of PCL samples was studied by the calorimetric technique. Mechanical properties of the different samples were determined by compression tests, and were compared with those corresponding to PCL in bulk prepared by melting. Four consecutive compression scans were performed on each sample. The variations observed in the results of the different scans are explained by a change in porosity or a change in the crystallinity of the sample.