0.0.1 Heat treatments

Samples of different types of polymers have been placed into a pressure cooker full of water for 20 minutes. In these conditions the samples have been heated at about $120°C$, that corresponds to the boling point of water in the cooker. Another different treatment that has been carried out is the locally heating of the samples throught a hot air gun. In this case the maximun temperature reached is about $150°C$. A third treatment has been done by filling the samples with $90°C$ hot water.

0.0.2 Heat treatments

Polymers subjected to heat treatments show different behaviours.
From pressure cooker test, it has been noticed that PP has became more opaque since it has increased its degree of crystallization due to the exposure at high temperature for prolungated time. PE has not displayed any modification since it is already a semicrystalline polymer at room temperature and its melting point is higher than the temperature reached in this process. PLA has exhibited a process of crystallization since its glass transition has been overcame. Moreover it has changed its shape trying to return back to its shape before processing. PET has shown the same behaviour of PLA trying to return back to parison shape and crystallizing in its most dense parts (neck and bottom of the bottle). PS samples have been deformed reaching their pre-process plate shape. The degree of crystallization of these samples was not particularly evident since PS has high glass transition temperature close to that of process.
In the second heat treatment the local heating of samples of PET and PS through the hot air gun has lead to similar results already described for the first treatment. The PE sample, instead, has shown more rubbery behaviour: it could be deformed a lot with high extension of chains due to this local heating.
In the last heat treatment it has been observed that PLA, as soon as the contact with hot water, has been deformed itself since its T_g has been overcame. About PP and PS samples nothing has changed since the temperature of water was not so high enough to reach, respectively, their T_m and T_g.