

## **Low temperature microwave treatment of high-density polyethylene**

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Microwave treatment is a very promising technique in industry for saving energy and wastes reduction such as waste plastics, biomass, and other materials. The three main products of low- and high temperature microwave treatment are gases, oils, and carbon-based material that may be further used. On the other hand, disadvantage of this method is a certain resistance of many waste materials to microwave radiation. For this reason, this study outlines possible techniques to achieve microwave treatment of resistant polymers in a microwave field.

In this study, waste polymer HDPE (high-density polyethylene), which is used in many industries and in people's daily life (baby bottles, PET bottle caps, water pipes, car tanks, etc.), was chosen as a treated material.

For mentioned above, this study focused on microwave treat/degrade HDPE using low temperatures and microwave radiation to produce clean secondary raw materials in the form of gas and oil that can be further used in industry. HDPE is a fine example of a material that is resistant to microwave radiation and has great potential for processing. The aim is to transfer and exceed the temperature limit so that the polymer can absorb microwave radiation on its own, so that direct microwave heating of the material subsequently occurs, and heat-transfer is from the theoretical centre of the material towards its surface.

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