

# Novel Carbonaceous Nanomaterials from Waste Polymers

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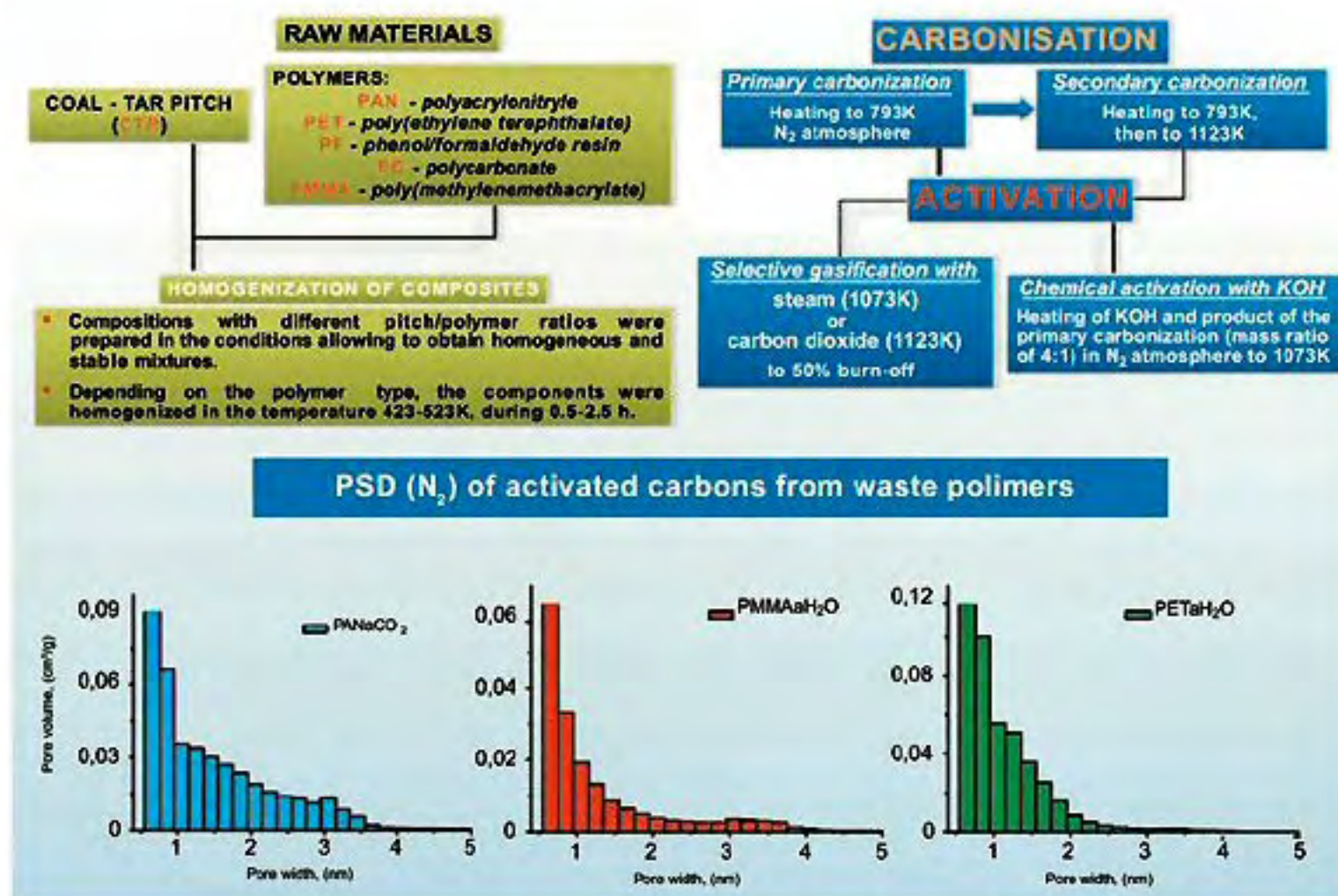
## Abstract

**Background:** Carbonaceous nanomaterials (activated carbons, carbon molecular sieves, activated carbon fibers) are amorphous solids consisting of micro crystallites with a graphite lattice. They differ from graphite by having a random imperfect structure which is highly porous over a broad range of pore sizes, as well as various surface functional groups. They are most often produced from natural feed stocks, such as hard coal, lignite, wood, peat, stones, and peels of the fruits by carbonization and activation.

**Methods:** Many investigations have been performed to explore polymers as raw materials, and to optimize the preparation conditions, and to obtain nanomaterials with the desired porous properties.

**Results:** The possibility to use the composites of coal-tar pitch modified with different types of waste polymers for the preparation of carbonaceous nanomaterials was studied. The influence of polymeric precursor, the mass ratio pitch/polymer, carbonization and activation conditions, type of activation agent used, on the porous texture were investigated. The surface functional groups were also determined.

**Conclusion:** Composites of coal-tar pitch and polymer waste can be converted to nanoporous carbonaceous adsorbents. These results allow to devise processes for a proper utilization of polymeric wastes, which is a very important issue both for economy and ecology.



**Keywords:** Pitch/polymer composites, waste polymers, nanoporous carbon, carbonization, activation, adsorption, textural properties, surface properties.