SUPERCRITICAL IMPREGNATION AND IN-SITU OXIDATIVE POLYMERIZATION ELECTRICALLY CONDUCTIVE POLYMER PARTICLES

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Abstract

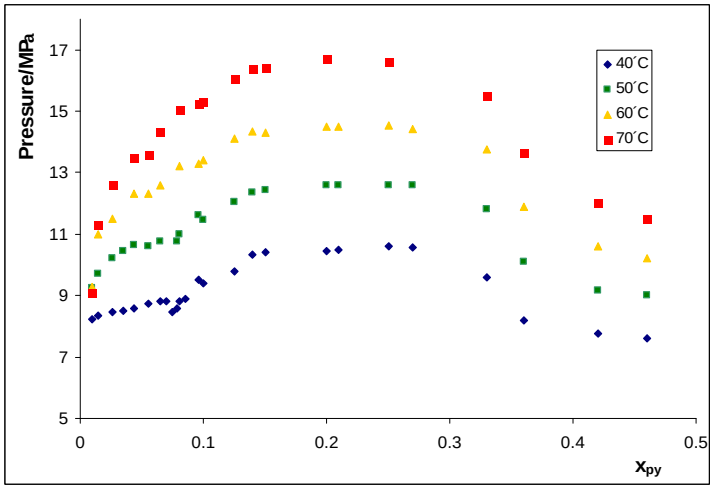
The earlier developed method[1] to form conductive polypyrrole blends from polymer fabrics and nonwovens was further developed, to make it capable to form core/shell structured particles on the micro- and nanoscale.

The method exploits the high diffusivity and low viscosity of the supercritical solvent, which increases highly the mass transport of pyrrole from the bulk phase to the swollen polymer.

Organic peroxide oxidants and sulfonic acid salt dopants have been tested in the oxidative polymerisation of pyrrole, avoiding the usage of co-solvents, which were necessary in the earlier method, where certain iron(III) salts were used.

The core/shell particles are characterized by FT-IR, electron microscopy, wide angle X-ray diffraction and thermogravimetry.

Further investigations have been made to describe and model the pyrrole-carbon dioxide binary system.



Saturation pressure, pyrrole-CO_2 system

[1] J. Pelto et al., Pat. WO2005071696 A1, publication date 4 Aug. 2005, application number FI05000053, application date 27 Jan. 2005, priority FI 20040114 (2005)