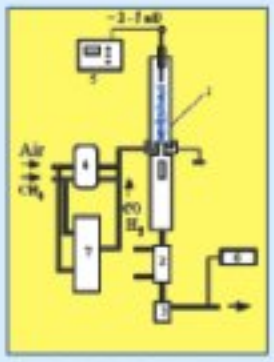
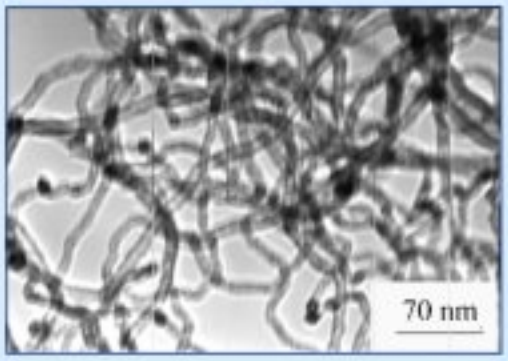
Properties of Carbon Nanomaterials (CNM) Obtained in Atmospheric-Pressure High-Voltage Discharge Plasma

General view and schematic diagram of experiemntal setup:

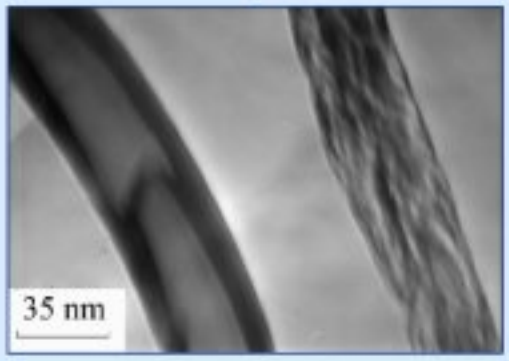
Setup diagram:
1 – plasma-chemical reactor; 2 – condenser; 3 – hotwell; 4 – gas supply system; 5 – power supply system; 6 – chromatograph; 7 – methane-to-hydrogen converter.

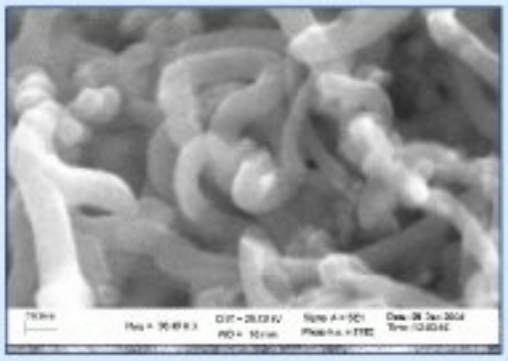




Tem pictures of synthesized carbon nanomaterial

Carbon nanotubes and nanofibers have different shapes. The diameter of these carbon formations varies from 10 to 150 nm.

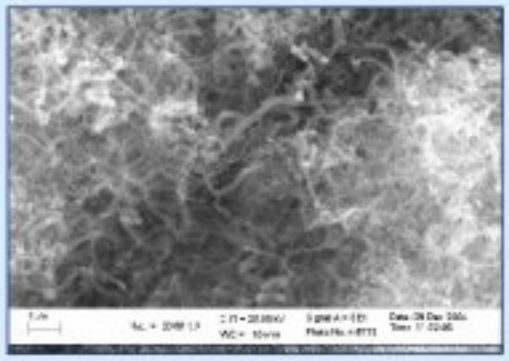




Sem pictures of carbon nanomaterial obtained

Properties of cnm synthesized in aphvd plasma

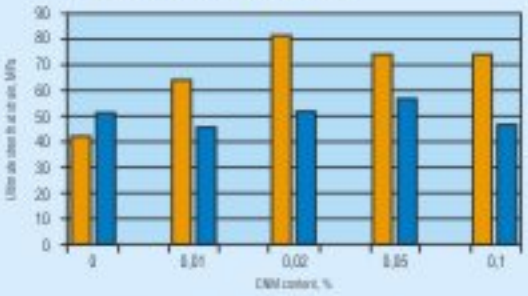
Average diameter, nm	Bulk density, g/cm³	Specific surface, m²/g	Specific heat capacity, J/(kg K)	Oxidation onset temperature, °C	Resistivity, Ohm cm
100	0.78	160-170	1000-1500	500	0.37



Modification of Polymer Composite Properties with Carbon Nanomaterials Additives

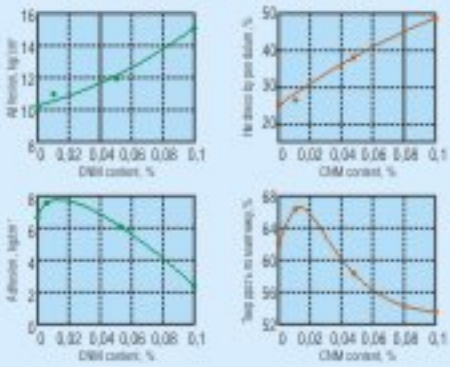
Application of synthesized CNM

Zytel polyamide film



Ultimate strength versus CNM content

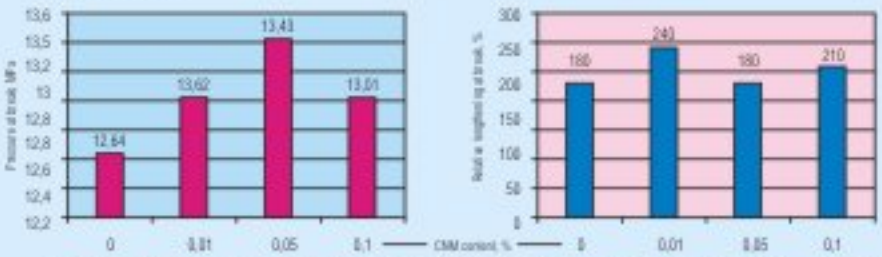
Polyamide paint



Fresh prepared paint

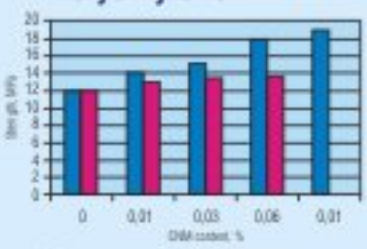
After artificial ageing T=150°C, t=1,5 hr

Rubber



Physical and mechanical indices of rubber based on rubber resin БНКС – 28АМ after testing in waste oil medium (T=700°C, t=120 h)

Polyethylene

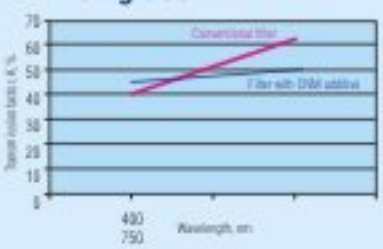


Direct mixing

Mixing in solution

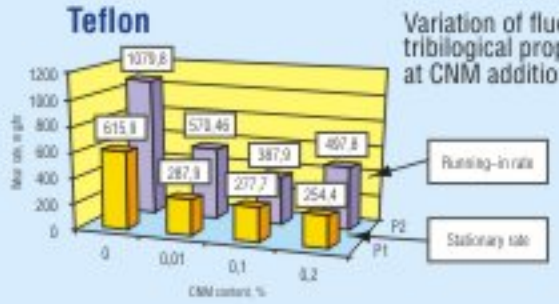
Ultimate strength versus CNM content

Plexiglass



Neutral filter transmission factor versus wavelength

Teflon



Variation of fluoroplastic tribilogical properties at CNM addition

Laboratory of Combustion Physics and Chemistry

Tel. +375 (17) 284-22-49
E-mail: krauklis@itmo.by