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Quantitative Defect Analysis of PAN-based Carbon Fibers Treated by Single and Dual HF RF-CCP MMGL ERZBEK GNGR, Dr. — This work states the effects of single (40.68 MHz) and dual (40.68/2.1 MHz) RF-CCPs on defect structure of the PAN-based carbon fibers. The fibers were treated between two identical aluminum electrodes with R∼200 mm in a 78.5 L stainless steel cylindrical reactor (R∼500 mm, H∼400 mm). The gap distance was 4 cm. In SRF mode, P_{HF} =50-200 W, p=0.3, 0.5, 0.75 and 1 Torr, t=30, 60 and 90 min. In DRF mode, P_{LF} =50-200 W, p= 0.1-0.9 Torr and t=15, 30, 45 and 60 min at fixed P_{HF} =50 W. The structural analyses of the treated fibers were done by using high sensitive confocal Raman spectroscopy and the surfaces were excited by 532 nm-100 mW He-Ne (2.33 eV) laser. The average defect size and density of the treated fibers were calculated according to the following formulas; L_D (size) = $(1.810^{-9}\lambda_L^4 I_G/I_D)^{1/2}$ and n_D (density) = $(1.810^{22}/\lambda_L^4)$ I_D/I_G where λ_L is the laser wavelength, I_D is the intensity of D-band (˜1350 cm^{-1}) and I_G is the intensity of G-band (˜1580 cm^{-1}).

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