Abstract: Prepared epoxy sheets were surface fluorinated in a laboratory vessel using a F_2/N_2 mixture with 12.5% F_2 by volume at 50 oC and 0.1 MPa (1000 mbar) for 10 min to suppress surface charge accumulation on the epoxy sheet. Attenuated total reflection infrared analyses indicate that the fluorination led to substantial changes in chemical composition and structure of the sheet surface layer. The thickness of the fluorinated layer was determined to be 0.42 μm by SEM observation of the cross-section of the fluorinated sheet, and its SEM image shows that the fluorination also resulted in an increase in surface roughness. As a result, the deposited corona charge cannot be stored on the fluorinated surface even at room temperature, compared with a stable surface charge of the nonfluorinated (original) epoxy sample which has deep surface charge traps as indicated by the open-circuit thermally stimulated discharge current measurement. The measurements of surface conductivity and contact angle and the calculation of surface energy reveal that the fluorination gave rise to dramatic increases in surface conductivity and surface wettability and polarity. A very likely substantial decrease in depth of charge traps in the fluorinated surface layer and the adsorbed water on the fluorinated surface are responsible for the high surface conductivity of the fluorinated epoxy sheet. Surface charging current measurements further show a large steady state current flowing along the fluorinated surface during corona charging, compared with the almost zero steady state current of the original sample. This therefore suggests a lower steady state surface potential and a smaller dynamic surface charge accumulation of the fluorinated sample during the charge.