

# Supplementary Materials: Structural and Functional Properties of Fluorinated Silica Hybrid Barrier Layers on Flexible Polymeric Foil

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## Calculation of Oxygen Transmission Rate (OTR)

The value of oxygen transmission rate was calculated on the basis of the pressure change in the measuring chamber 2 at ambient temperature according to the Equation (S1):

$$\text{OTR} = \left( 24 \times \frac{T_0}{T} \times \frac{1}{P_0} \times \frac{1}{dP_{(\text{chambers})}} \times \frac{10^4 \times V}{A} \times \frac{dp}{dt} \right) \times C \left[ \frac{\text{cm}^3}{\text{m}^2 \times 24\text{h} \times 0.1\text{mpa}} \right] \quad (\text{S1})$$

where:

$T_0$ —temperature under standard conditions, (0 °C);

$T$ —temperature under measurement conditions, (°C);

$P_0$ —pressure under standard conditions, (Pa) (100 000);

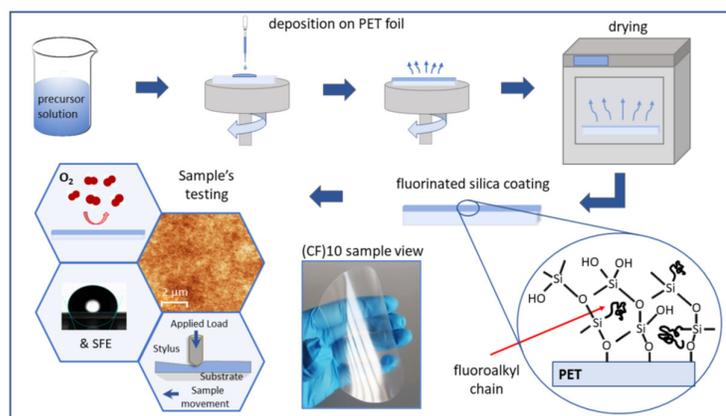
$dP_{(\text{chambers})}$ —pressure difference between chamber 1 (upper) and chamber 2 (bottom) at the beginning of measurement, (Pa);

$V$ —volume of chamber 2 (bottom), (cm<sup>3</sup>) (10.6664);

$A$ —sample surface, (cm<sup>2</sup>) (31.1);

$C$ —chamber dependent constant value (dimensionless).

Taking into account the samples thickness the oxygen permeation coefficient could be estimate by multiplying OTR and thickness value.



**Figure S1.** Scheme of fabrication process and testing of coatings deposited on PET foil. Picture shows bended (CF)10 sample.

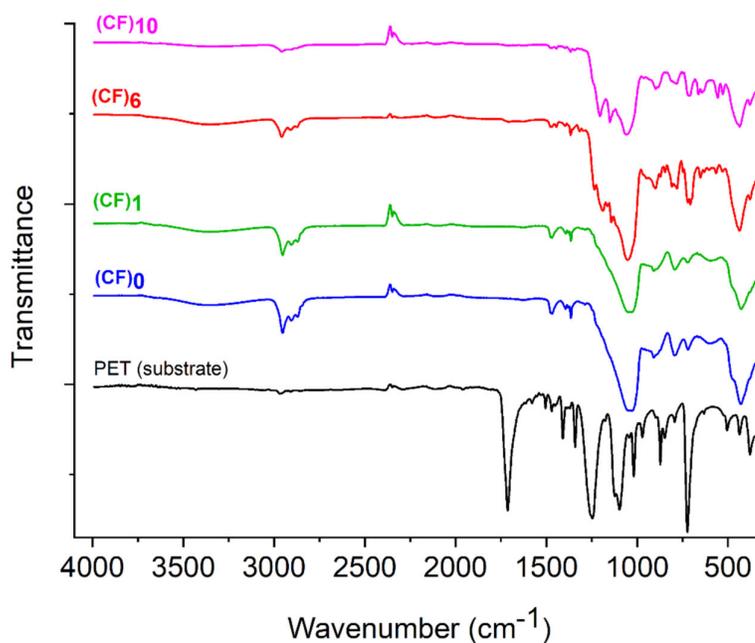


Figure S2. FTIR spectra in the whole measurement range of all coatings and bare PET foil.

Table S1. Silica precursors used for syntheses (colours of particular atoms in structures: oxygen-red, silicone-gray, carbon-blue, fluorine-green).

Primary Silica Precursors	3rd Precursor with Fluorinated Alkyl Chain	Sample Notation
	None	(CF)0
Ethyl silicate, ES	Trifluoropropyltrimethoxysilane, TFPTMS	(CF)1
Isooctyltriethoxysilane, IOTES	Perfluorooctyltriethoxysilane, PFOTES	(CF)6
	Perfluorododecyltriethoxysilane, PFDDTES	(CF)10