

***Modulated discharges for the design of nanosized micron-long ribbons of crystalline teflon: mechanism and properties***

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Radiofrequency tetrafluoroethylene glow discharges modulated with duty cycles lower than 10%, and a total period of 100 ms, lead to the formation of thin amorphous films with crystalline ribbon-shaped structures superimposed. These Teflon-like ribbons are many microns long and tens of nanometer thick and exhibit spectacular hydrophobicity (water contact angles even exceeding 160°).

We have performed both IR absorption spectroscopy of the gas phase and time resolved emission spectroscopy during the time ON period in order to evaluate the effect of CF<sub>2</sub> precursors in the plasma. The material characterization has been made by XPS, SEM, AFM and X-ray diffractometry.

The goals of this work are:

- the study of structure evolution with time ON;
- the definition of a process control diagnostics;
- the rationalization of the mechanism of deposition and the reasons for the generation of the ribbon structure.

The figure shows a typical SEM morphology of the nanosized μ-long ribbons of crystalline Teflon-like.

