Space materials challenge

Malgorzata Holynska[1]

[1] *ESA ESTEC, Keplerlaan 1, TEC-QEE #office nr. EF071 - PO Box 299, NL-2200 AG Noordwijk, The Netherlands, malgorzata.holynska@esa.int*

Space environment is a challenge for materials constituting spacecraft, it can entail exposure to vacuum, radiation, atomic oxygen and multiple thermal cycling between extreme temperatures. These materials might be even subjected to long-term storage for many years in cleanroom environment before actually being launched to space. Therefore careful selection and design with rigorous testing are needed before materials can be accepted for space applications.

In this lecture challenging factors of space environment will be introduced along with exposed materials for space applications, including coatings and in particular non-metallic materials such as adhesives. This will be illustrated with some flagship ESA missions like BepiColombo or Solar Orbiter and the associated testing / modelling activities.