Contribution ID: **43** Type: **Contribution type**

Unique properties of Pyrolytic Graphite for extreme conditions

Tuesday, 8 June 2021 12:40 (20 minutes)

Modern accelerators offer more bright source of X-rays and particles, intense laser beams and reproduce astrophysically relevant conditions in laboratory. To investigate or monitor such sources, materials that survive in the vicinity of extreme processes are needed.
Well Aligned Pyrolytic Graphite (WAPG) offers interesting solutions for working in a harsh environment due to a unique combination of properties. Consisting of light carbon with of highest purity, the material has outstanding thermal conductivity and can withstand extreme thermal and radiation loads, neutrons and debris flow. An important feature of all forms of WAPG is unique reflectivity of X-rays that is additionally increased by enlarged acceptance angle in the case of Graphite Optics (GrO).
WAPG is obtained by stress annealing of pyrolytic carbon at temperatures near 3000oC. Variation of annealing conditions results in different PG forms, whose properties can be configured for different applications.
The flexible forms of PG are used for production of GrO. The optics in von Hamos geometry became a routine tool for analysing the temperature, density and ionization of plasma. The advantage of GrO for plasma application is discussed. Unique thermal and radiation stability makes GrO applicable in an extreme environment, where other optical elements degrade. Some examples of the optics used by our customers in X-rays Thomson Scattering (XRTS)- spectrometer were given.
GrO as well as bulk HOPG crystal are promising as pre-reflector protecting the subsequent detection chain for ITER and similar facilities.
Thin films of a few cm2 and only of 1-5um micron thick are available from a HOPG produced in special annealing conditions. The films are recently used as stripping foils of increased stability for cyclotrons and innert X-way windows in analytical cuvees.

Primary authors: GRIGORIEVA, Inna (Optigraph GmbH); Dr ANTONOV, Alexander (Optigraph GmbH)

Presenter: GRIGORIEVA, Inna (Optigraph GmbH)

Session Classification: Session