Enhancement of product durability and usability for resource-efficient society

R&D Project Title: Realization of non-destructive observation techniques of defects & cracks triggering fatigue and degradation

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Targets:

R&D of observation techniques of voids and cracks with a spatial resolution in the range from nm to few tens of nm, which has been difficult with conventional analytical techniques.

Outline:

It is required to detect “precursors” of fatigue and degradation in order to predict the lifetime of materials and extend it. For its realization, it is inevitable to observe “precursors” at scales from nano to micrometers, before the fatigue and degradation become apparent at a macroscopic scale.

In this project, we will utilize X-ray microscopy with synchrotron radiation and positron annihilation, and develop analytical techniques for observation of voids and cracks with a spatial resolution in the range from nm to few tens of nm. The obtained results are essential for understanding the occurrence “precursors” and developing various parameters used in mechanical calculations and simulations.

https://sip-sm4i.kek.jp/

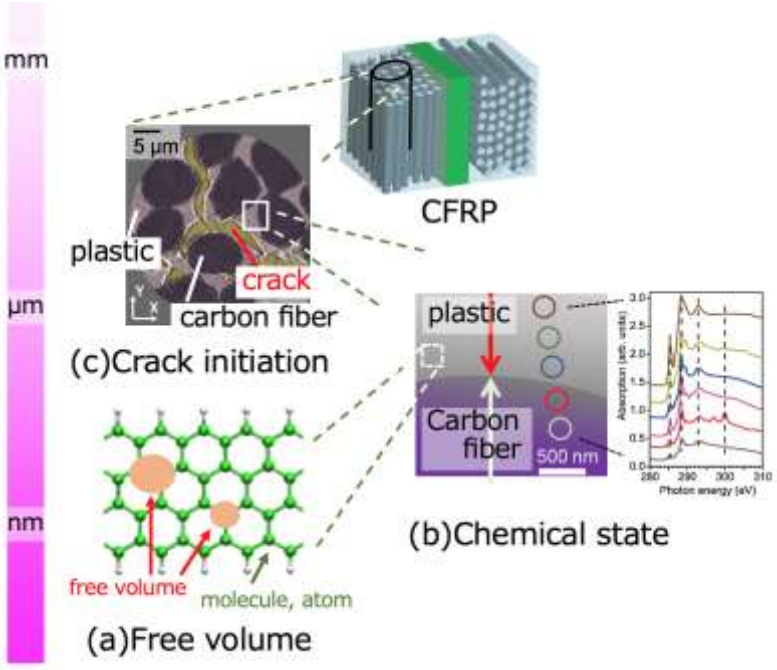

Fig. Defects and cracks in CFRP (schematic).