# CFRP metallisation for optical applications

**Reference: TD-DE-1073**

## TECHNOLOGY DESCRIPTION

Optical mirrors for space are massive constructions due to the high density of the materials employed (metal and/or ceramics). For this reason, CFRP (carbon-fibre reinforced plastic) and a new coating technique were used to produce optical mirrors with a mass that is at least 80 % lower than that of conventional systems.
The basis for this is a metallization process developed for CFRP. In this process, flat samples are chemically pickled using a special procedure and then galvanically nickel-plated. The nickel surface is turned to mirror quality using the UPD process (ultra-precise turning). In the next step, parabolic mirrors with a diameter of approx. 30 cm are produced and nickel-plated. Before the UPD process, the mirror is measured to rule out deformations caused by internal stresses.

## INNOVATIVE ASPECTS

The present result of the technology is a metallised CFRP parabolic mirror with considerable weight savings. Although the stability under changing temperatures could still not be proven, there is great potential for applications at a constant temperature, e.g. in the context of ground-based mirrors for astronomical purposes. These are mobile and operate at constant low temperatures.

## TECHNOLOGY READINESS (in space application)

TRL 9 (2024)

## COUNTRY OF ORIGIN

Germany

## LATEST UPDATE

06/2024

**TAGS** #coating #CFRP #metallisation #nickel-plate #mirror #lightweight

## APPLICATION AREAS

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