Direct writing on PbWO$_4$ monocrystalline using X-rays

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The lithographic profile on the material surface is usually based on making structural changes in the intermediate - technological layer using radiation, and the subsequent transfer of the resulting topology to the underlying layer of the functional material. However, not all materials enable the removal process that meets the sufficient selectivity value. This report presents the results of direct writing a relief on an inorganic PbWO$_4$ crystal using synchrotron radiation in the X-ray range.

X-ray stimulated profiles on the PbWO$_4$ - surface

First observation of x-ray direct writing on PbWO$_4$ monocrystalline in water as black circles

An exposed (left) and unexposed (right) areas in reflected light

Interference pattern from the PbWO$_4$-surface; exposed (left) and unexposed (right)

Monocrystalline transformation under X-rays

Exposure cell filled with deionized water

Transmittance, %

wavelength, nm

Star shaped test microstructure of 65 µm high on copper substrate.

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Litterature


Conclusion

For the first time in the world, the process of etching lead tungstate in water under the influence of x-ray radiation was recorded.