

# Photocrosslinking of Metal Oxo-Clusters: A versatile route towards functional metal oxide micro-nanopatterns

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W-501 seminar room, 5F WPI/MANA Bldg., Namiki site



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### Abstract

Metal oxo-cluster (MOC) prepared from Zr, Ti or Hf precursors were synthesized and used as photocrosslinkable hybrid building blocks for direct write lithography. Deep-UV irradiation (DUV -  $\lambda < 250$  nm) was used to generate micro-nanopatterns by DUV-induced condensation of the MOC. Photocrosslinking of Ti, Zr and Hf oxo-clusters was proved and investigated by means of in situ FTIR and spectroscopic ellipsometry. In the case of Ti-oxo clusters, we demonstrated that the material can be fully mineralized into  $\text{TiO}_2$  by DUV irradiation. Finally, we used DUV interferometric lithography to illustrate nanopatterning based on these photoresists. Resolution like 50 nm was achievable. These inorganic photoresists open new doors towards room temperature preparation of high-resolution inorganic nanostructures with strong interest for practical applications in electronics, optics, photonics or biology since they can be used in other lithographic setup and they can be easily doped to other properties.