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# Solution-based deposition of ceramics on glass substrates for alkali-metal vapor cells.

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Atomic polarization lifetime of alkali-metal vapor, such as rubidium, is limited by physico-chemical interactions between confined atoms and glass structure of gas-filled cells [1], including hollow-core fibers. These interactions can be inhibited by the addition of a protective ceramic coating between the gas and the glass. A careful control of the ceramic deposition glass substrates enables the modulation of the physico-chemical interactions between the alkali-metal vapor and the glass [2]. In our study, we have focused on the deposition of ceramic thin films, such as aluminosilicates, on glass substrates [3] with different concentrations, various cleaning treatments [4] prior to the deposition of thin films, and by modifying annealing temperature and coating deposition methods. AFM investigations (see an example in fig.1) revealed that the microstructure of the thin films depend on the cleaning method of the glass substrates, which ensures a regular wetting of the glass surface, the concentration employed for the coating depositions and the annealing temperature. The different parameters have a large influence on the microstructure and roughness of the films, when transparent and very homogenous coatings, as well as and smooth surfaces are desirable for optical applications.

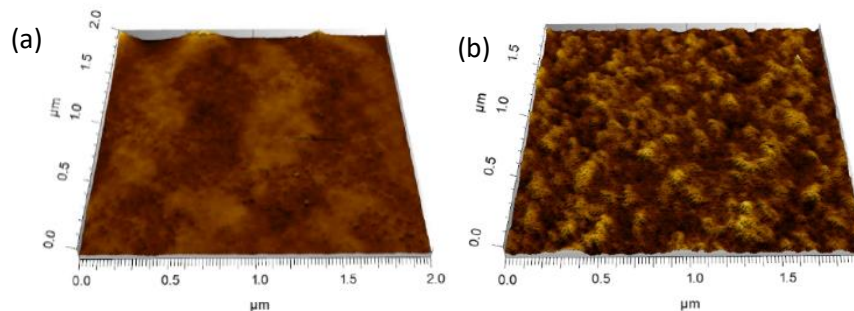


Figure 1: AFM images of aluminosilicate thin film deposited on glass substrates by dip-coating, pre-immersed in hydrogen peroxide (a) and (b) on a substrate solely rinsed with ethanol.

*Keywords: alkali-metal vapor cells, ceramic, coating, glass surface, chemical solution deposition*

## References

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