

## Accepted Manuscript

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PII: S0040-6090(17)30681-8  
DOI: doi: [10.1016/j.tsf.2017.09.014](https://doi.org/10.1016/j.tsf.2017.09.014)  
Reference: TSF 36214  
To appear in: *Thin Solid Films*  
Received date: 24 May 2017  
Revised date: 2 September 2017  
Accepted date: 8 September 2017

Please cite this article as: M.S. Lebedev, V.N. Kruchinin, M.I. Lebedeva, E.V. Spesivtsev, Compositionally tunable optical properties of hafnium titanium oxide films deposited by atomic layer deposition without intermediate surface hydroxylation, *Thin Solid Films* (2017), doi: [10.1016/j.tsf.2017.09.014](https://doi.org/10.1016/j.tsf.2017.09.014)

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**Compositionally tunable optical properties of hafnium titanium oxide films deposited by atomic layer deposition without intermediate surface hydroxylation**

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**Keywords:** Thin films; Tunable properties; Hafnium titanium oxide; Ellipsometry; Molecular layering; Atomic layer deposition; Adsorption

**Abstract**

A technique for films deposition with a composition gradient over the substrate area was suggested.  $(\text{TiO}_2)_x(\text{HfO}_2)_{1-x}$  films with a monotonously varying coefficient "x" over the length of the sample (combinatorial library) were prepared using the physicochemical features of atomic layer deposition (ALD) method. Systematic research on the deposited films thickness and optical properties was carried out by the methods of monochromatic (scanning) and spectral ellipsometry using the appropriate dispersion models. This allowed estimating the range of  $\text{HfO}_2$  and  $\text{TiO}_2$  concentrations, realized in the sample deposited by the proposed technique. The variation ranges of the thickness  $d$ , refractive index  $n(E)$ , and optical band gap  $E_g$  were found. The obtained results provide further information on the chemical reactions occurring in this kind of ALD processes.

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