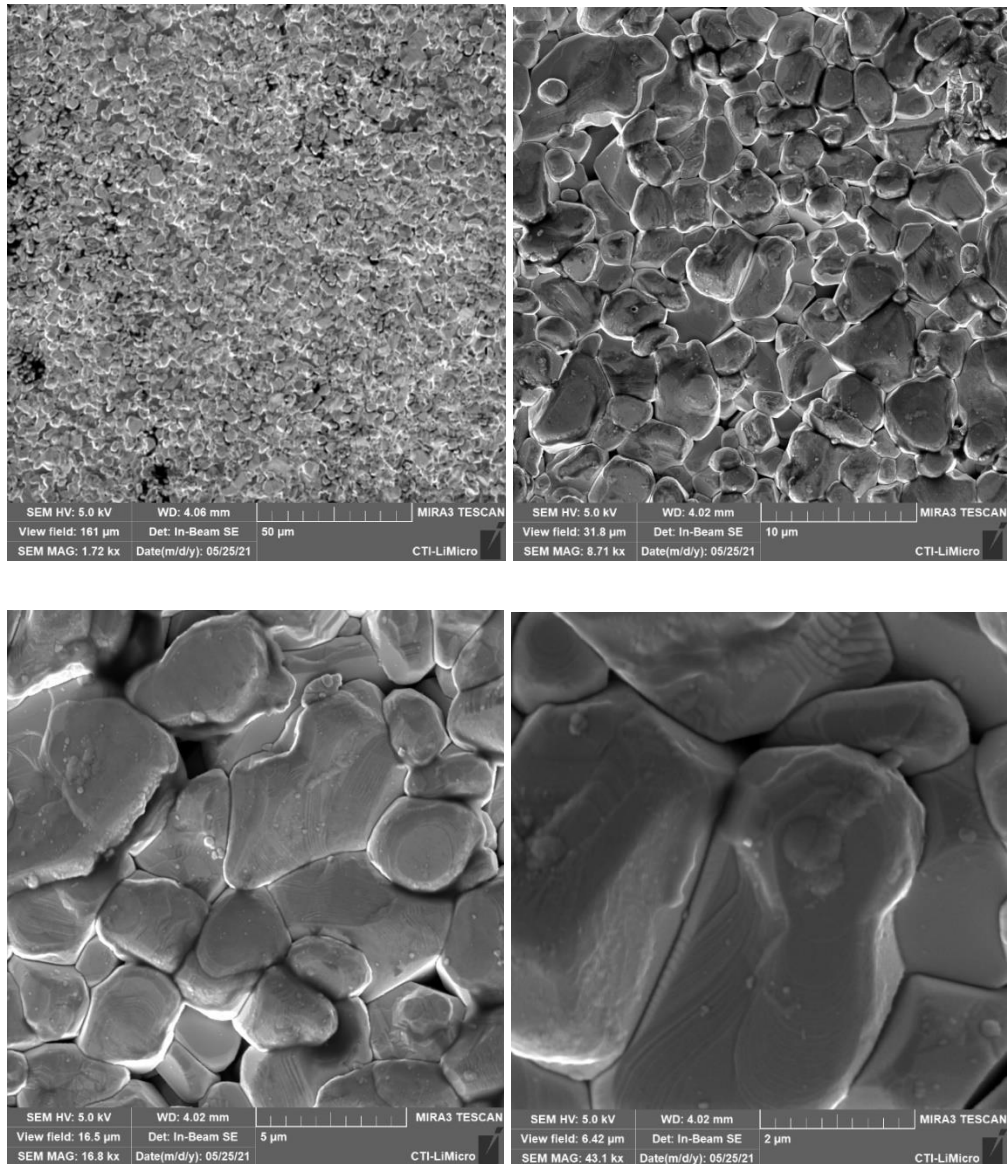


## Annx



**Annx1:** Scanning Electron Microscopy of the TaN film surface varying the magnification.

Table 1: Parameters calculated and extracted from the CxV and IxV curves of the MOS capacitors with TaN/TiO<sub>2</sub> deposited by RF/ALD sputtering, with a thickness of 2 nm of TaN. Flat band voltage ( $V_{FB}$ ), hysteresis ( $\Delta V_{FB}$ ), Maximum capacitance ( $C_{m\acute{a}x}$ ), Minimum capacitance ( $C_{m\acute{i}n}$ ), Effective charge density ( $Q_o/q$ ) and Leakage current density in accumulation and inversion.

TaN - 2 nm - square							
Top electrode size	$V_{FB}$	$\Delta V_{FB}$	$C_{m\acute{a}x}$	$C_{m\acute{i}n}$	$Q_o/q$	Leakage current in +2V (accumulation)	Leakage current in -2V

							(inversion)
$\mu\text{m}$	Volts	Volts	Faraday	Faraday	(/cm <sup>-2</sup> )	j(A/cm <sup>2</sup> )	j(A/cm <sup>2</sup> )
800	1,24	0,02	3,5E <sup>-4</sup>	9,9E <sup>-5</sup>	- 4,23E <sup>17</sup>	8E <sup>-2</sup>	-9,2E <sup>-6</sup>
400	1,72	0,13	1,42E <sup>-4</sup>	2,45E <sup>-5</sup>	- 9,54E <sup>17</sup>	7,5E <sup>-2</sup>	-7,3E <sup>-6</sup>
200	1,85	0,04	8,17E <sup>-5</sup>	6,05E <sup>-6</sup>	- 2,35E <sup>18</sup>	8E <sup>-2</sup>	-6,7E <sup>-6</sup>
100	1,90	0,03	3,36E <sup>-5</sup>	1,4E <sup>-6</sup>	- 4,00E <sup>20</sup>	7E <sup>-2</sup>	-5,4E <sup>-6</sup>

Table 2: Parameters calculated and extracted from the CxV and IxV curves of the MOS capacitors with TaN/TiO<sub>2</sub> deposited by RF/ALD sputtering, with a thickness of 4 nm of TaN. Flat band voltage ( $V_{\text{FB}}$ ), hysteresis ( $\Delta V_{\text{FB}}$ ), Maximum capacitance ( $C_{\text{máx}}$ ), Minimum capacitance ( $C_{\text{mín}}$ ), Effective charge density ( $Q_0/q$ ) and Leakage current density in accumulation and inversion.

TaN - 4 nm - square							
Top electrode size	$V_{\text{FB}}$	$\Delta V_{\text{FB}}$	$C_{\text{máx}}$	$C_{\text{mín}}$	$Q_0/q$	Leakage current in +2V (accumulation)	Leakage current in -2V (inversion)
$\mu\text{m}$	Volts	Volts	Faraday	Faraday	(/cm <sup>-2</sup> )	j(A/cm <sup>2</sup> )	j(A/cm <sup>2</sup> )
800	1,4	0,01	3E <sup>-4</sup>	8,2E <sup>-5</sup>	-4,04E <sup>17</sup>	1,5E <sup>-1</sup>	-3,3E <sup>-2</sup>
400	1,8	0,01	1E <sup>-4</sup>	2,0E <sup>-5</sup>	-7,03E <sup>17</sup>	9,2E <sup>-1</sup>	-4,2E <sup>-1</sup>
200	2,04	0,01	4E <sup>-5</sup>	5,0E <sup>-6</sup>	-1,27E <sup>18</sup>	9,4E <sup>-2</sup>	-8,5E <sup>-4</sup>
100	2,08	0,01	8E <sup>-6</sup>	1,2E <sup>-6</sup>	-1,01E <sup>20</sup>	9E <sup>-2</sup>	-6,4E <sup>-4</sup>