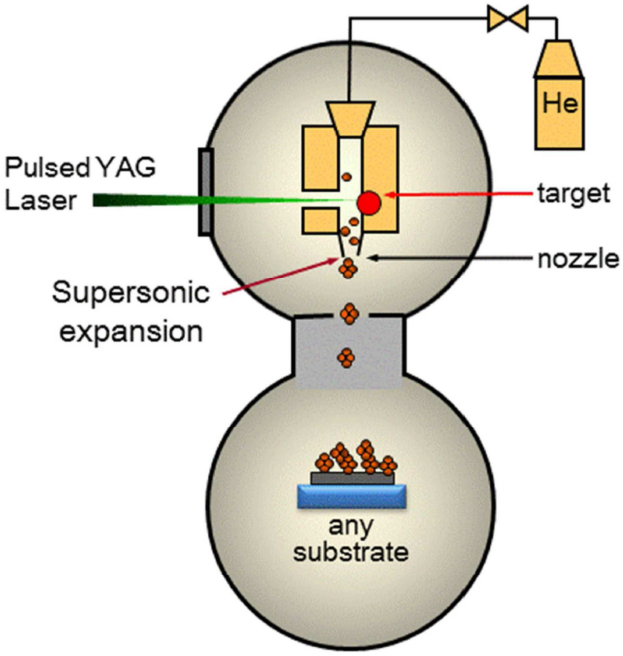
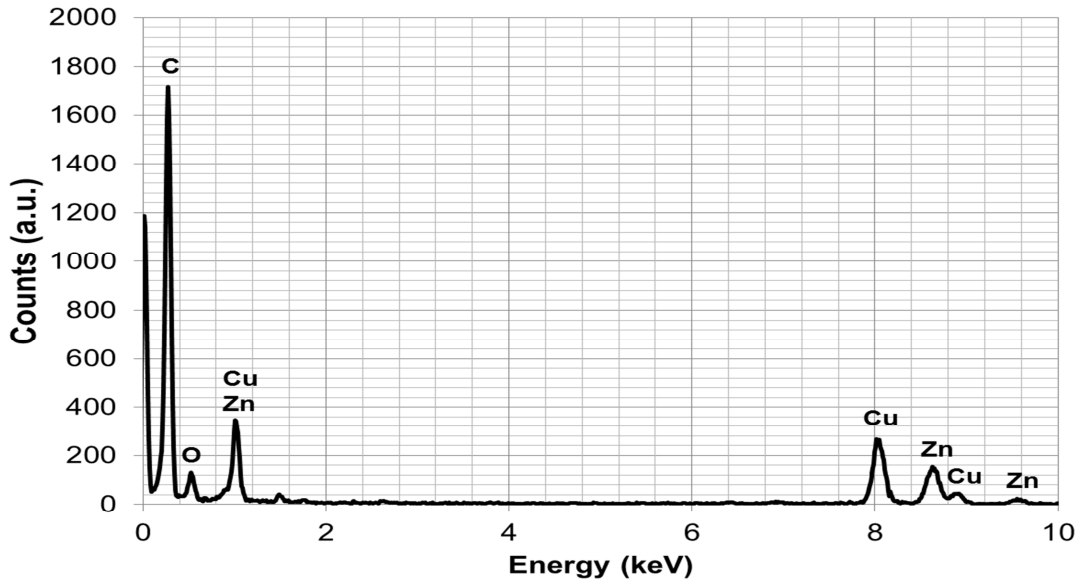
1. LECBD set up



Deposition chamber
(high vacuum)

2.EDS analysis

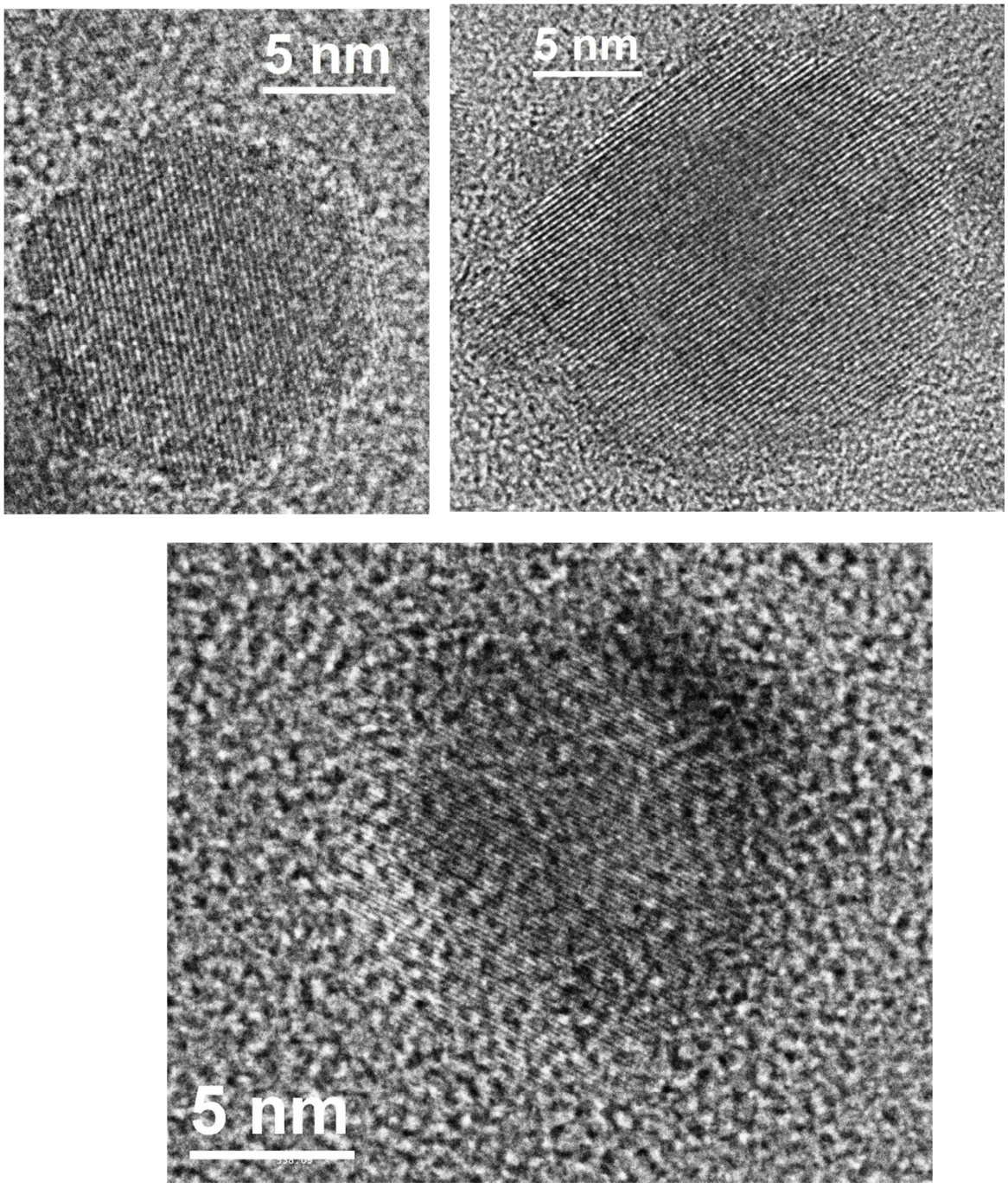


Number of analysed spots	**20**
Mean Zn fraction	**0.40**
Uncertainty	**0.03**

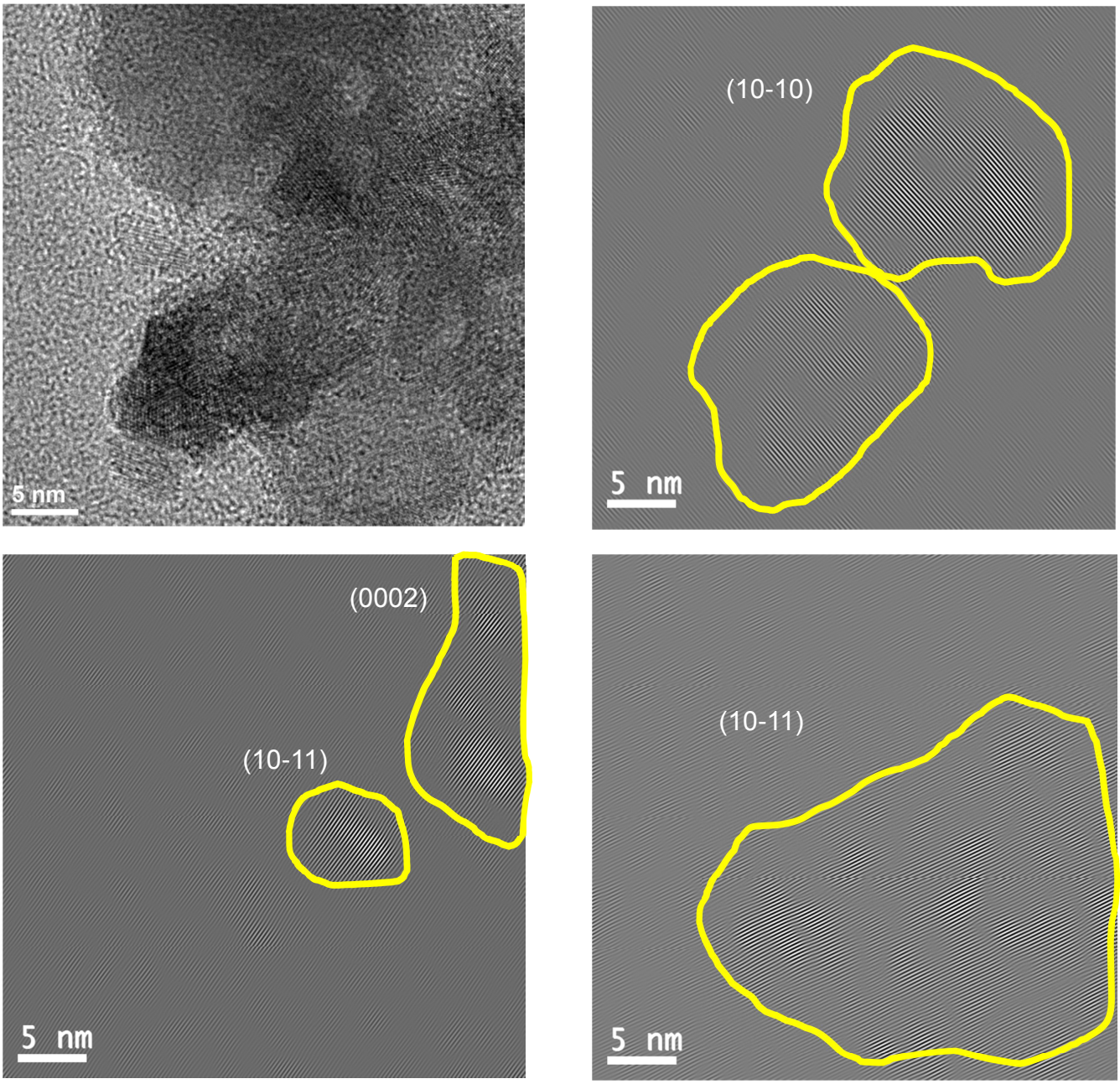
Uncertainty : half width of the bilateral interval calculated with a level of confidence of 95%. using a Student law with 19 degrees of freedom

Typical EDS spectrum of ZnO nanocrystals and statistics on the Zn fraction. showing that the composition is constant all over the sample. The determined composition of Zn0.4O0.6 is not stoichiometric since the particles have been put at air during the transfer between the deposition chamber and the SEM. In addition. some oxygen may be adsorbed all over the sample. The real stoichiometry is obtained by *in situ* XPS analysis (see text). The relevant information provided by the EDS analysis is that the uncertainty level is as low as 0.03 implying that the composition is identical at the nanoscale. The copper observed comes from the interior of the SEM chamber whereas the carbon presence results from a contamination layer.

3. HR TEM images of several large individual as-deposited nanoparticles. The images illustrate that they are crystallized, rather isotropic in shape.



4. HR TEM image of several crystalline domains resulting from the OA (top left). The distinct domains are visible on the images reconstructed from the filtered FFT image (top right. bottom left and right). The deposition has been made in the presence of the electric field. No particular direction for the OA can be observed. Large domains along the (10-10) direction are seen on the top right panel. On the bottom right panel. a large domain has its {10-11} reticular plane family in the Bragg diffraction orientation. However the extension of the domain is fairly isotropic. On the contrary. the domain observable in the bottom left panel exhibits (0002) planes but its extension is anisotropic and is not along the [0002] direction.



5. Statistical analysis of the effect of the electric field orientation on the particle orientation

number of diffracting planes							
Orientation	2-10	101	100	002	102	103	sum
without E	13	23	17	18	7	2	80
E perpendicular	35	48	83	39	13	6	224
E parallel	24	64	46	32	25	17	208
sum	72	135	146	89	45	25	512

table of theoretical contingency							
Orientation	2-10	101	100	002	102	103	sum
without E	11.250	21.094	22.813	13.906	7.031	3.906	80
E perpendicular	31.500	59.063	63.875	38.938	19.688	10.938	224
E parallel	29.250	54.844	59.313	36.156	18.281	10.156	208
sum	72	135	146	89	45	25	512

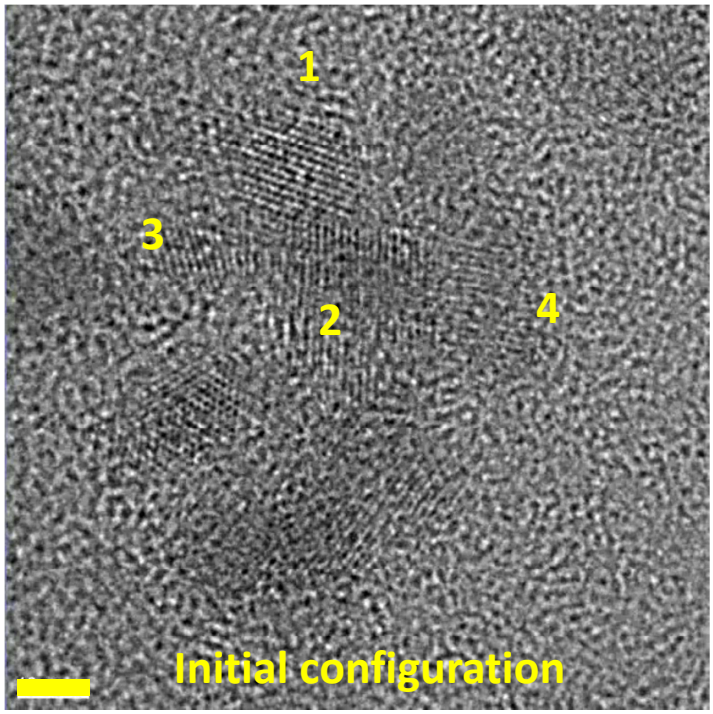
deviation						
Orientation	2-10	101	100	002	102	103
without E	0.2722	0.1723	1.4810	1.2051	0.0001	0.9303
E perpendicular	0.3889	2.0720	5.7263	0.0001	2.2716	2.2289
E parallel	0.9423	1.5287	2.9879	0.4778	2.4693	4.6116

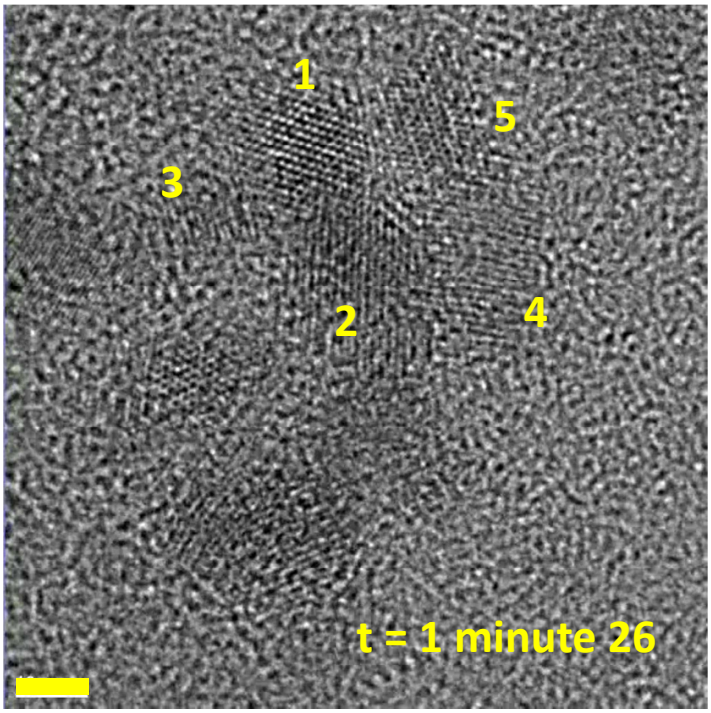
the values in red are significant; the others are not statistically relevant (not accurate enough)

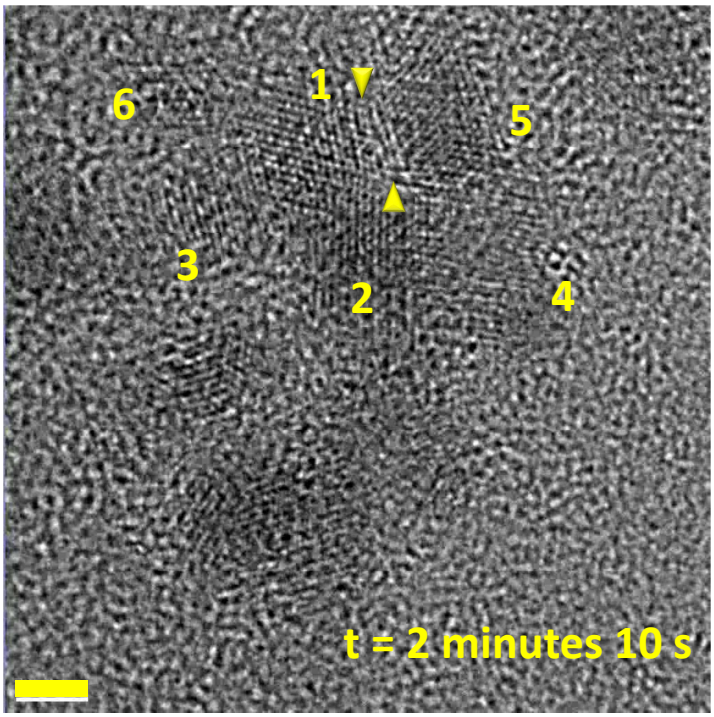
Khi² observed	29.766	**H0 rejected : the plane orientation depends on the field**
alpha	0.01	
Khi² critic	23.209	

H0, hypothesis checked : the plane orientation is independent on the field orientation

6. dynamics of a particle cluster observed by TEM.







Initially, several particles can be distinguished. Particles 2 and 4 seem already orientally attached, whereas particle 3 is definitely not in such a configuration.

After 1 minute and 26 seconds, particle 3 has moved up toward particle 1, the junction between particles 2 and 4 is better defined (no dislocation as initially) and particle 5, which was scarcely visible at the initial stage, is now diffracting.

At t = 2s 10s, particle 1 is in epitaxy with particle 3, and orientally attached to particles 2 and 5. The grain boundary between the particles is not perfect as evidenced by the presence of a dislocation (spotted by the two arrows). Particles 4 and 5 are still in epitaxy. The energy provided by the e-beam has led to the formation of a large crystalline domain through oriented attachment, as reported by van Huis *et al.* *Nano Lett*. **2008**, *8*, 3959-3963.

For all images, the scale represents 5 nm.