

1 Article

2 High volume-per-dose and low resistivity of cobalt 3 nanowires grown by Ga⁺ Focused Ion Beam Induced 4 Deposition

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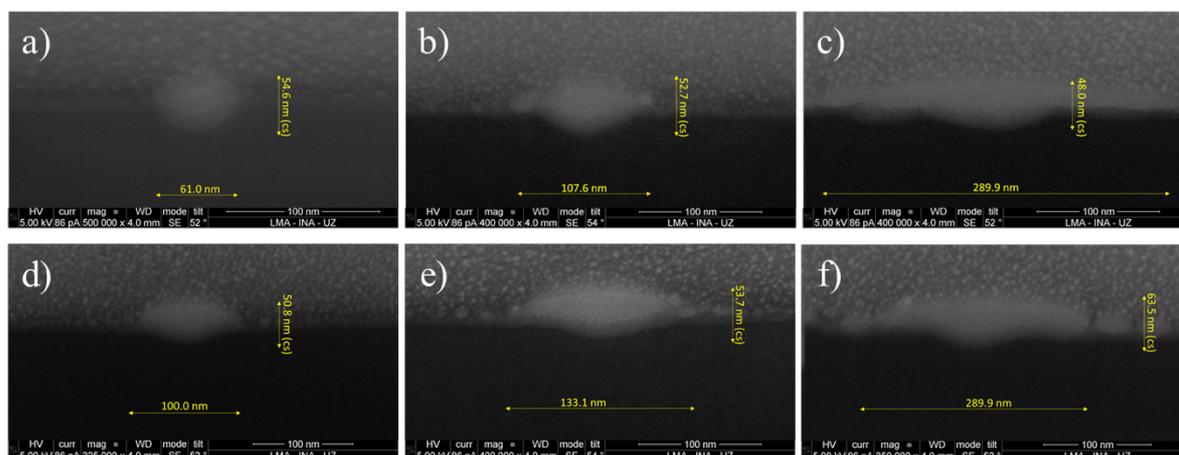
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14 1. Morphological analysis by SEM imaging

15 The cross-section of Co-FIBID NWs is analyzed in Figure S1. Qualitative chemical information
16 is also provided by the secondary electron SEM images, since heavier elements (Co of the NW and Pt
17 of the deposit coverage) emit more secondary electrons than lighter ones (Si of the substrate, in this
18 case). Regarding the deposits shape, for small ion doses, the NWs have quite well-defined rounded
19 section. However, as the dose increases, the NW cross-sectional shape tends to be more spread and
20 wider each time (and with an increasing halo), though the thickness does not experience significant
21 changes.



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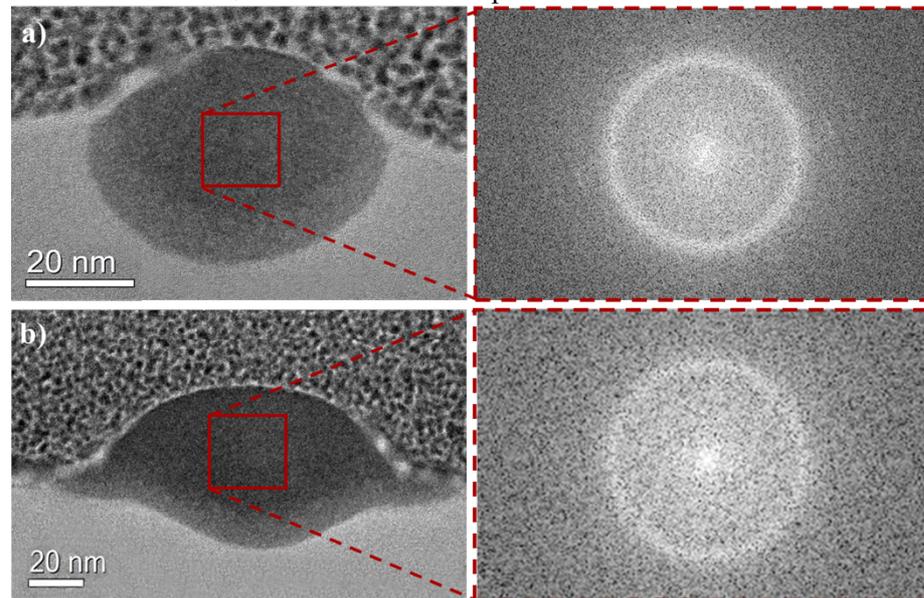
23 **Figure S1.** SEM images of Co-FIBID cross-sections for current 1.5 pA with dose (a) 0.017 nC, (b) 0.161
24 nC, (c) 1.287 nC; and current 9.7 pA with dose (d) 0.128 nC, (e) 0.224 nC and (f) 1.601 nC.

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26 2. HRTEM imaging

27 HRTEM images (Figure S2) display a nanocrystalline microstructure, with no texture. The Fast
28 Fourier Transform (FFT) reveals just a diffuse ring, indicating the lack of defined atomic planes and,
29 thus, the presence of a pseudo-amorphous structure. In these HRTEM images, lower-density
30 elements (Si as substrate) appear brighter than the heavier species (Co from the NW and Pt from the

31 protective layer for the TEM lamella preparation). It is possible to appreciate how the NW region
32 closer to the substrate seems to have an average density lower than the rest of the deposit, suggesting
33 a chemical intermixing with the Si. In addition, these HRTEM images confirm that the NWs shape is
34 more defined for lower ion doses, whereas it tends to spread as the dose increases.



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36 **Figure S2.** HRTEM images of Co-FIBID NWs of (a) 1.5 pA, 0.017 nC and (b) 9.7 pA, 0.224 nC. Each
37 HRTEM image is accompanied by the corresponding FFT of the indicated area of the image.

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