



## Supporting Information

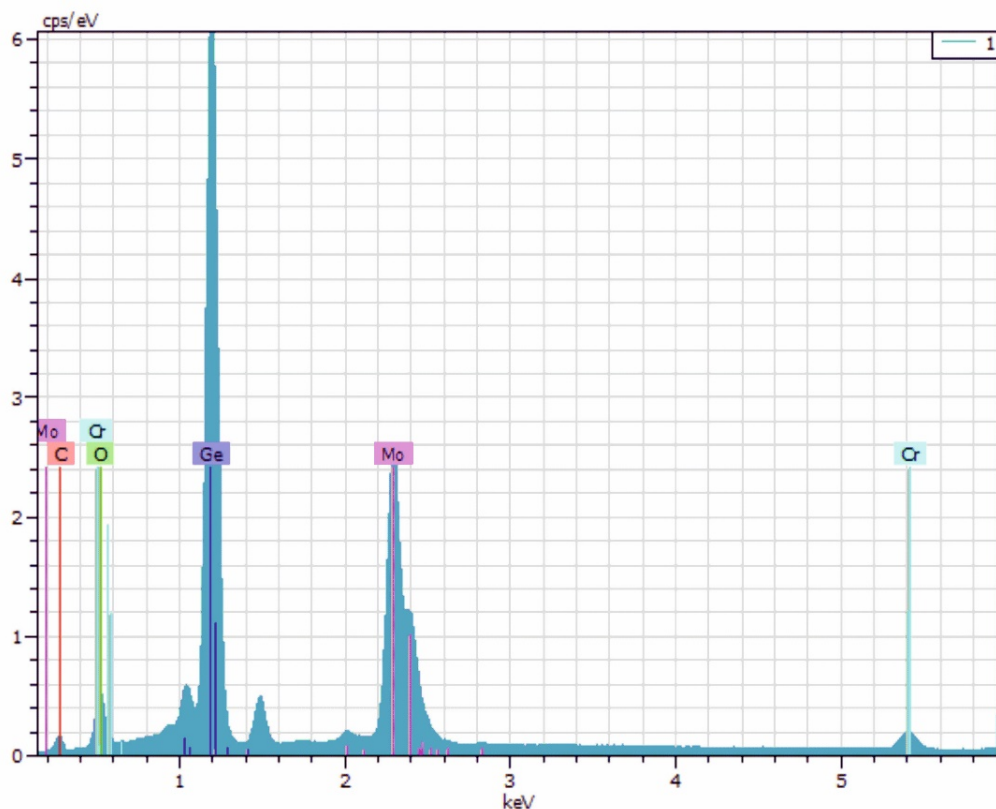
for

### **Chemical vapor deposition of germanium-rich $\text{CrGe}_x$ nanowires**

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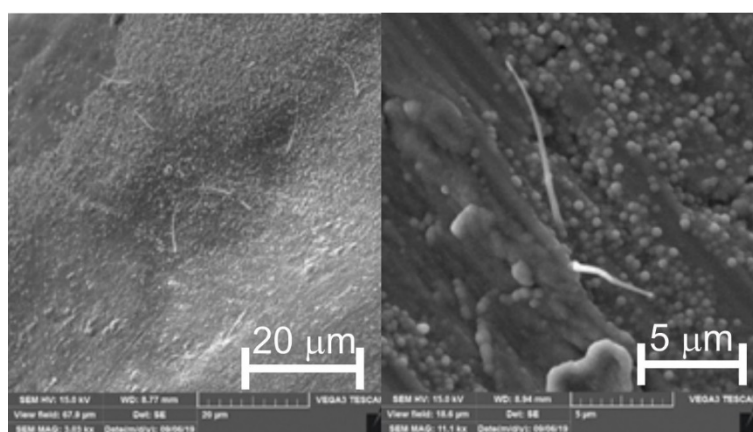
*Beilstein J. Nanotechnol.* **2021**, 12, 1365–1371. doi:10.3762/bjnano.12.100

### **Analysis of $\text{CrGe}_x$ nanowires, experimental contacting for $I$ – $V$ characteristics, and scheme of CVD apparatus**

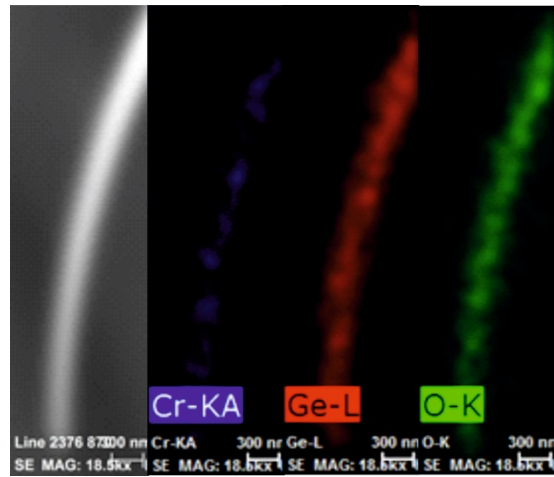


El	AN	Series	unn. C [wt.%]	norm. C [wt.%]	Atom. C [at.%]	Error (1 Sigma) [wt.%]
C	6	K-series	6.52	5.59	22.55	0.93
O	8	K-series	9.58	8.22	24.87	1.20
Cr	24	K-series	3.48	2.99	2.78	0.13
Ge	32	L-series	56.14	48.16	32.11	3.15
Mo	42	L-series	40.85	35.04	17.68	1.45
Total:			116.59	100.00	100.00	

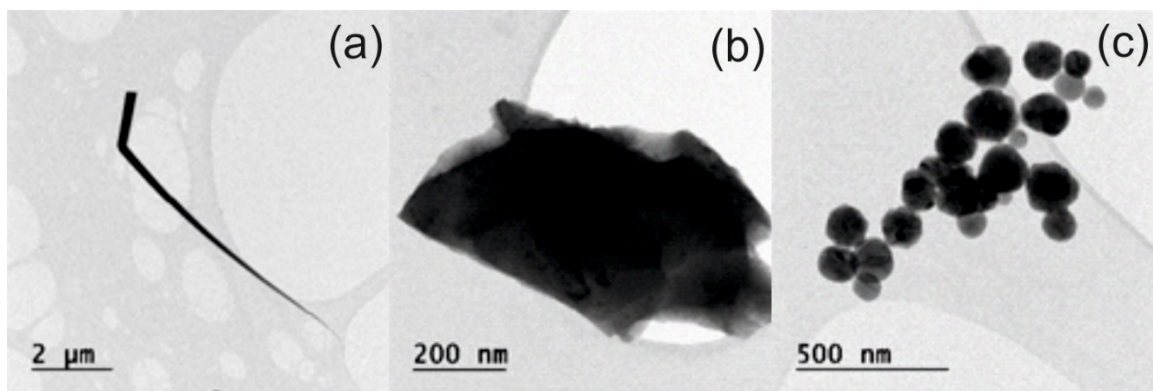
**Figure S1:** EDX analysis of a Cr/Ge deposit.



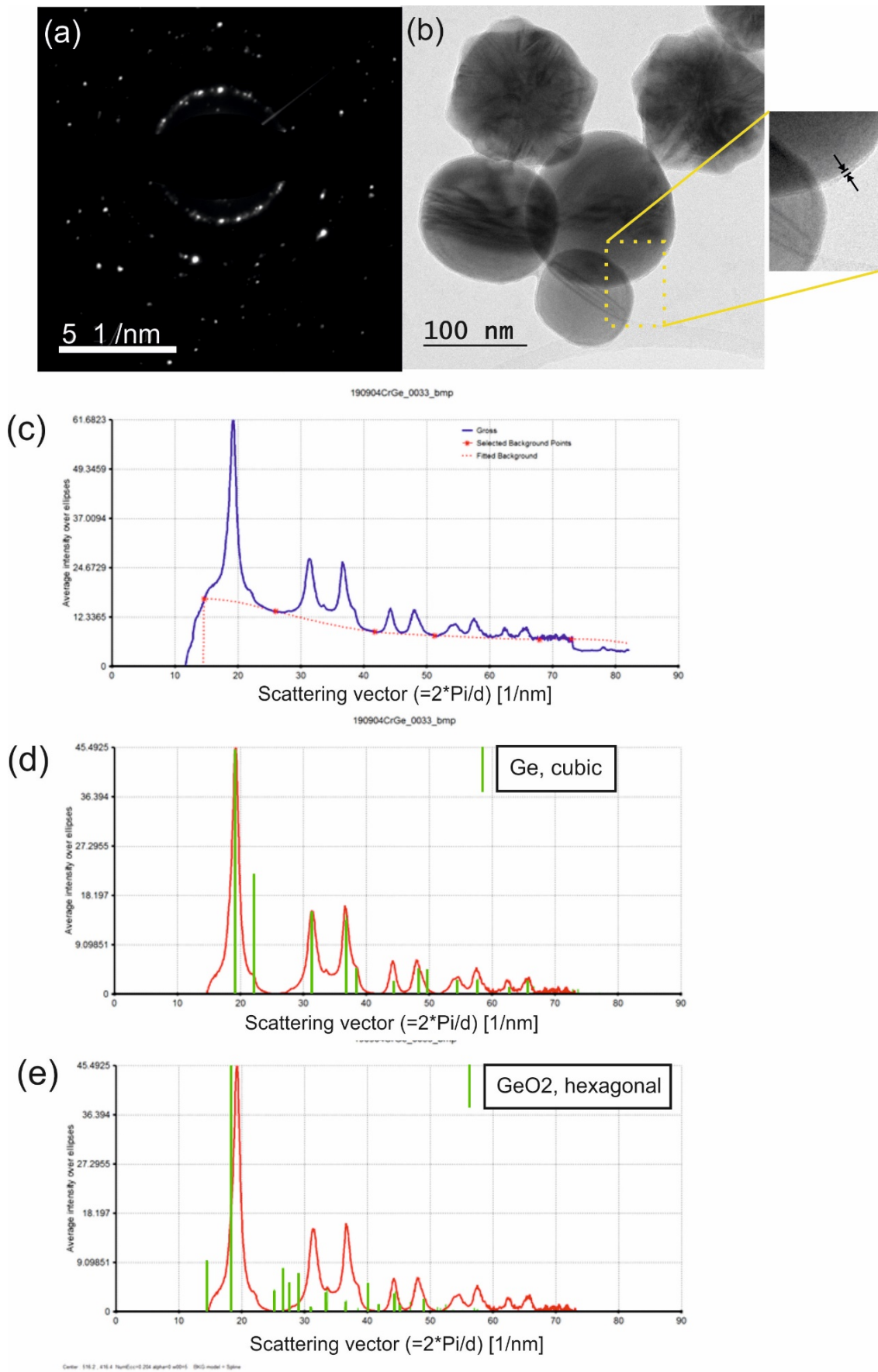
**Figure S2:** Tapered nanowires scarcely growing from a deposit.



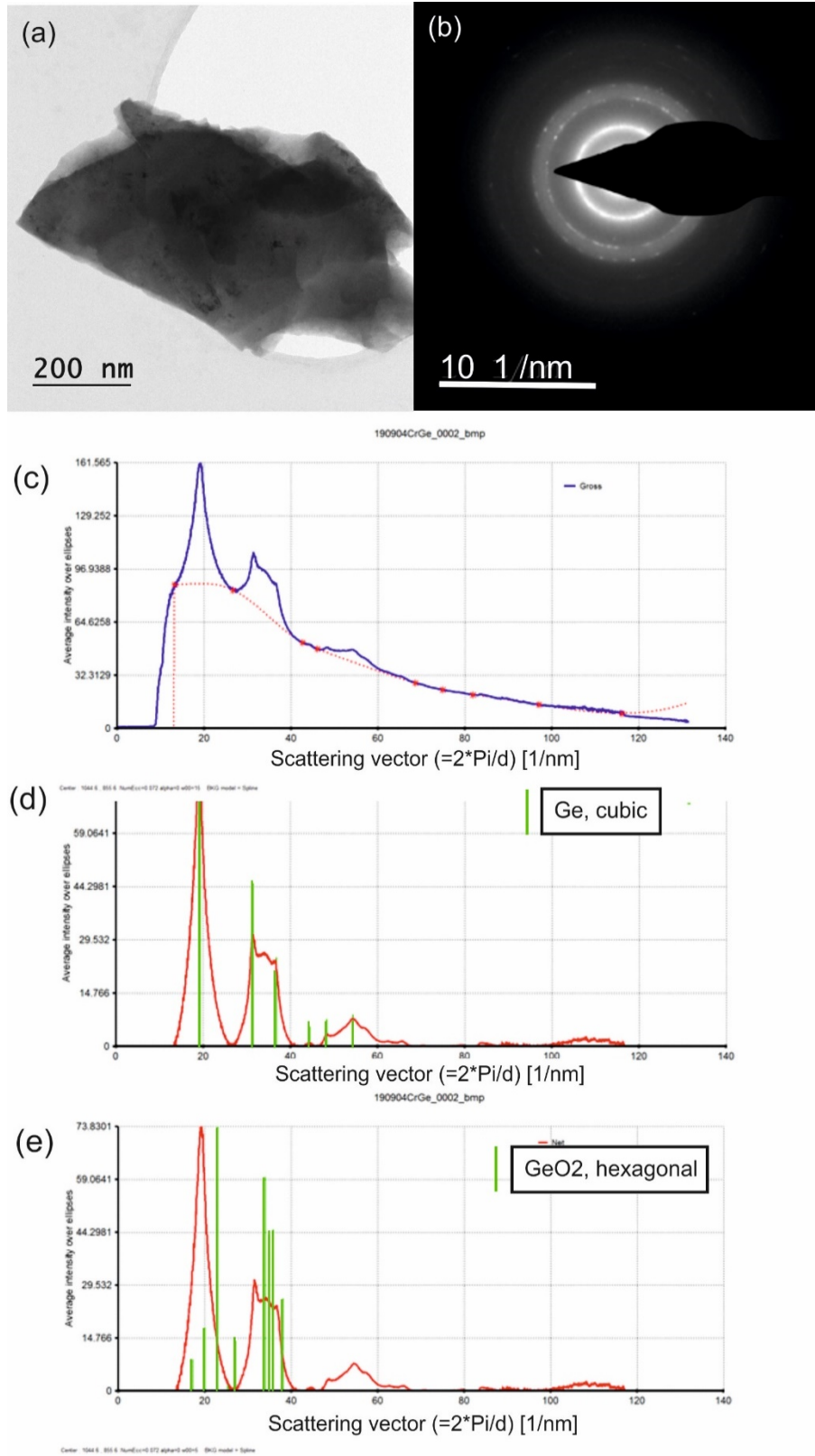
**Figure S3:** Elemental mapping of a single nanowire.



**Figure S4:** Nanoobjects observed during HRTEM analysis: (a) nanowires, (b) objects of an irregular shape, and (c) nanoballs.

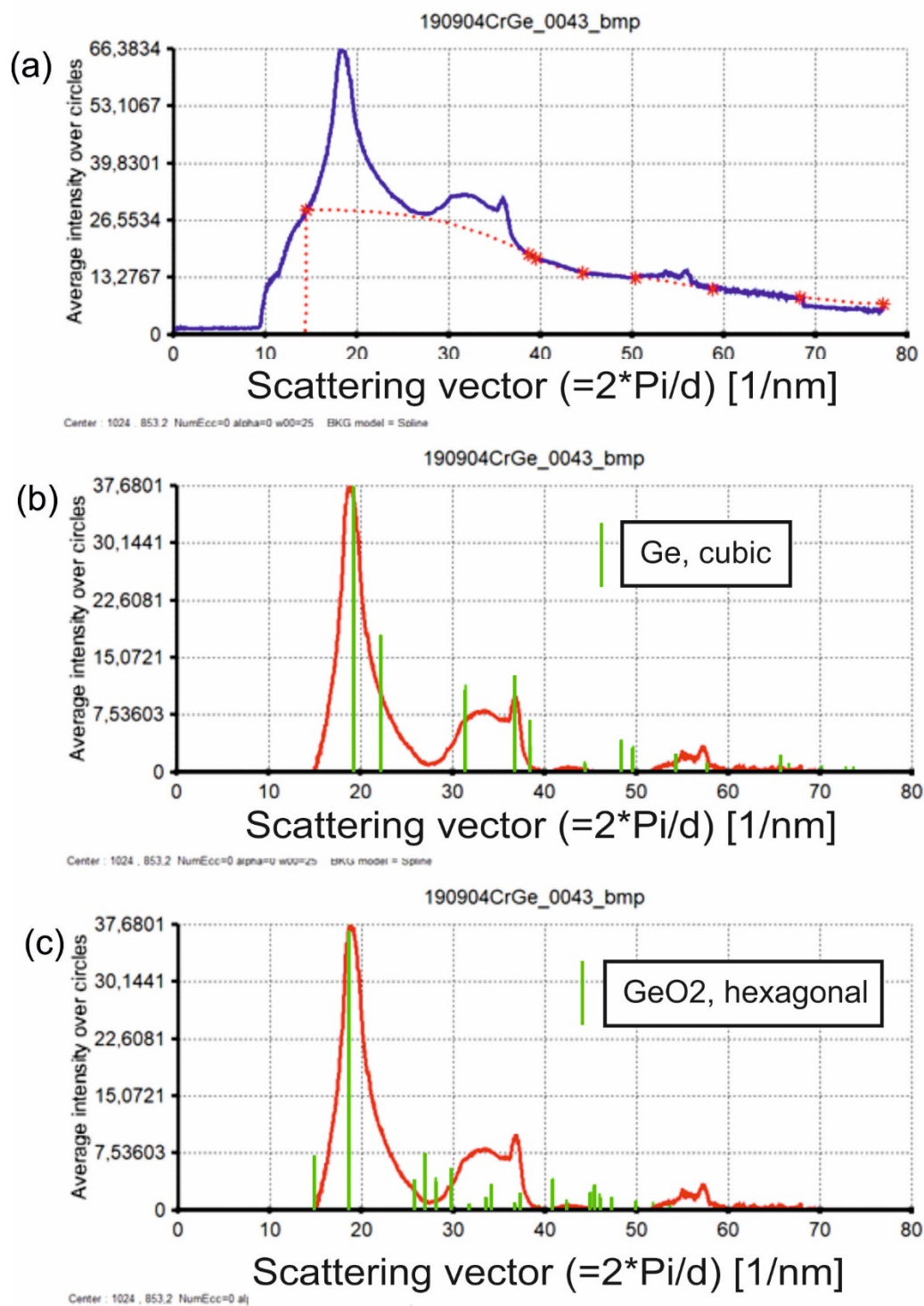


**Figure S5:** SAED analysis of nanoballs. (a) SAED image, (b) HRTEM photo with part of nanoballs magnified to make visible an oxidized layer ( $\sim 5 \text{ nm}$ ) on the nanoball surface, (c) SAED image converted into an intensity diffractogram, before background subtraction, and (d) Ge cubic (PDF 65-9209) and (e) GeO<sub>2</sub> hexagonal (PDF 85-1515) markers in diffractogram after background subtraction.

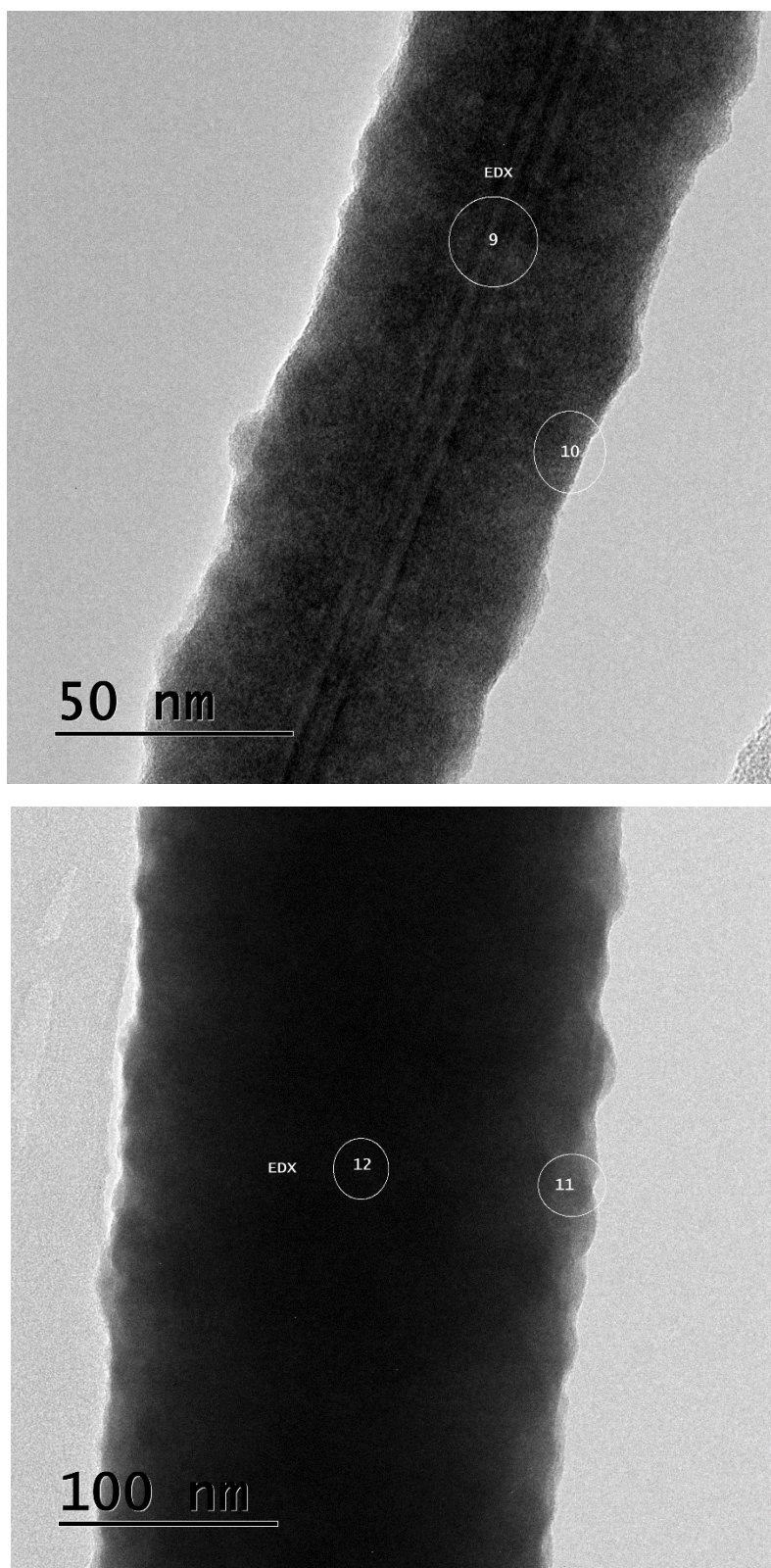


**Figure S6:** SAED analysis of an irregular object. (a) SEM photo, (b) SAED image, (c) SAED image converted into an intensity diffractogram, before background subtraction, and (d) Ge cubic (PDF 89-3833) and (e) Ge hexagonal (PDF 51-0767) markers in diffractogram after background subtraction. Diffuse rings and distinct points indicate an amorphous phase and the cubic/hexagonal phase, respectively.



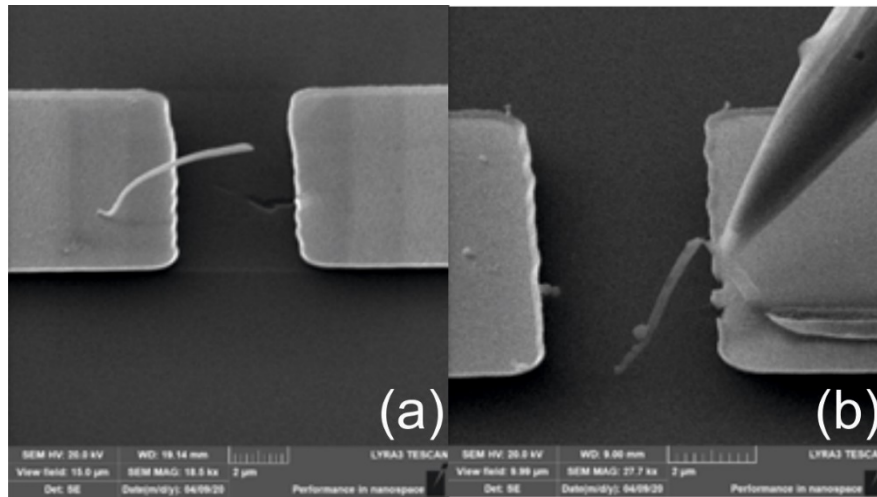


**Figure S7:** SAED image (Figure 3b) converted into (a) an intensity diffractogram, before background subtraction, (b) Ge cubic (PDF 65-9202) and (c) GeO<sub>2</sub> hexagonal (PDF 83-0544) markers in diffractogram after background subtraction.

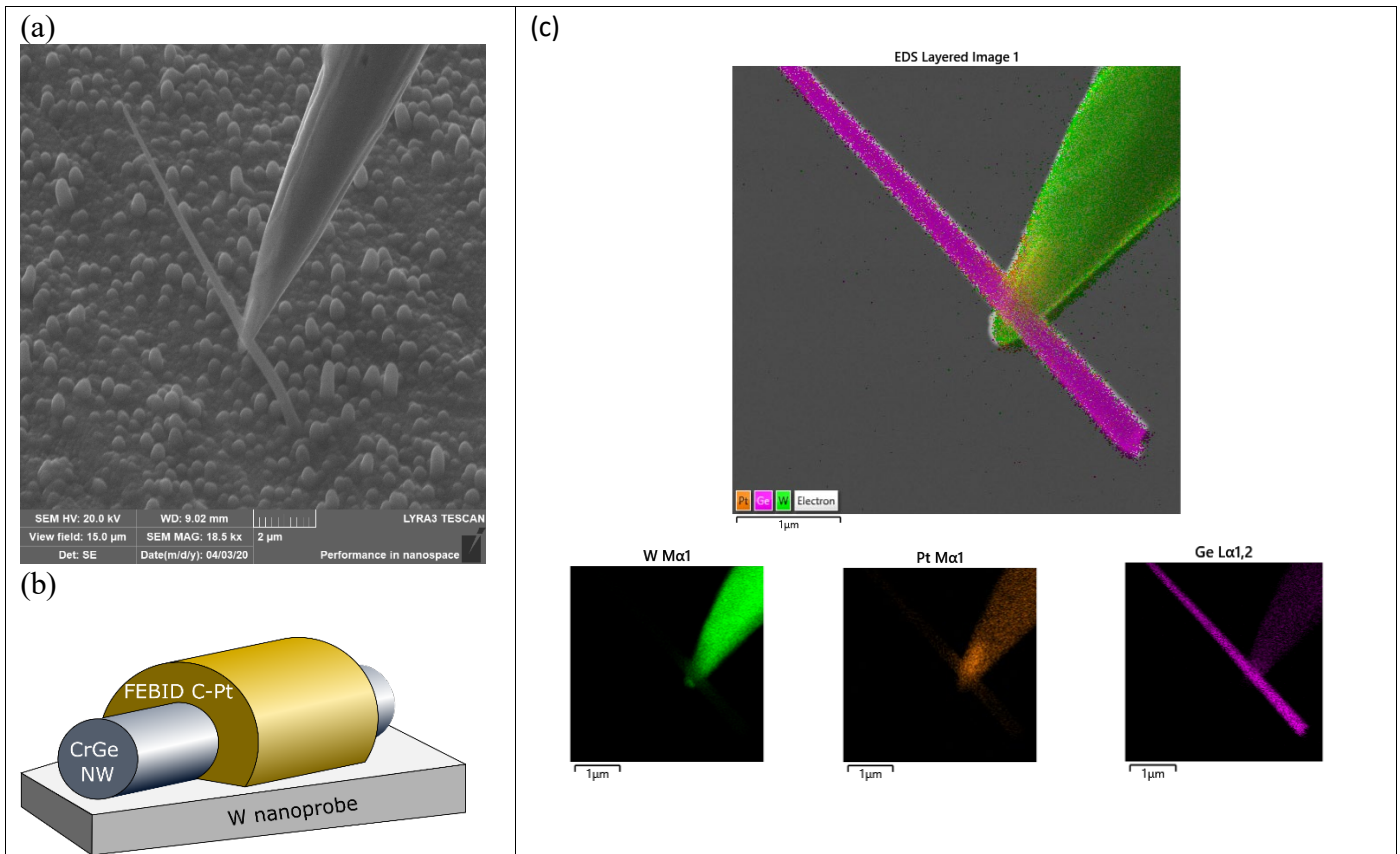


**Figure S8:** HRTEM images of a nanowire body with indicated EDX spots.

Elemental composition:  $[Cr]/[Ge]/[O] = 1:9.7:3.8$ , point 9- middle of NW comprising core+coating  
 $[Cr]/[Ge]/[O] = 1:6.5:4.0$ , point 10 – only NW coating  
 $[Cr]/[Ge]/[O] = 1:7.0:4.3$ , point 11 - only NW coating  
 $[Cr]/[Ge]/[O] = 1:9.0:4.0$ , point 12 - middle of NW comprising core+coating

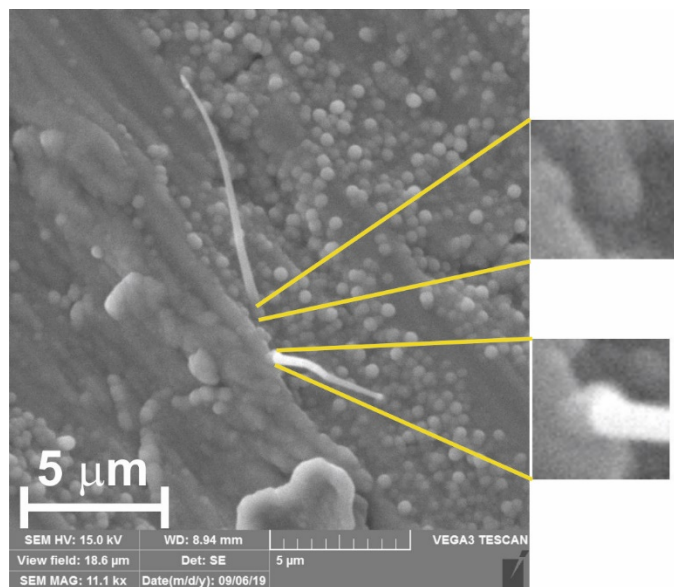


**Figure S9:** (a, b) unsuccessful attempt to transfer the NW onto lithographic pads.

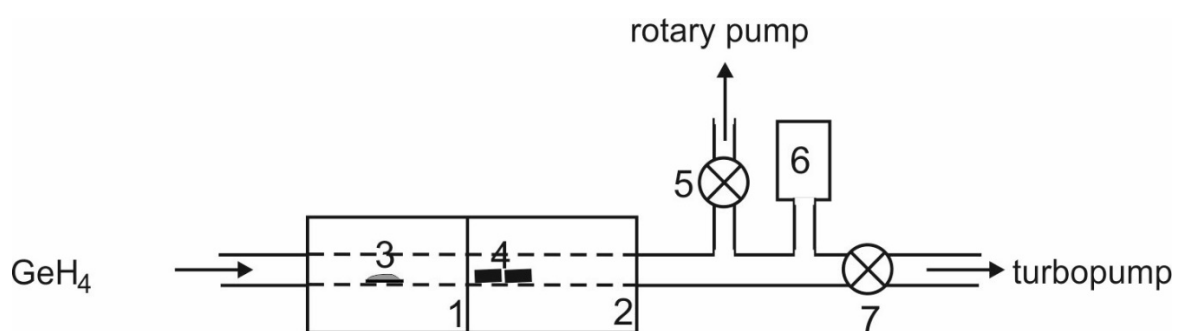


**Figure S10:** (a) SEM image of the GeCr nanowire that was contacted by the nanomanipulator tip for  $I$ – $V$  measurements, (b) the detail of the point contact between the CrGe<sub>x</sub> nanowire and the nanomanipulator tip, and (c) elemental mapping of the point contact between the CrGe<sub>x</sub> nanowire and tungsten tip.





**Figure S11:** Typical nanowire bottoms corresponding to original nanoballs from which the nanowires started to grow.



**Figure S12:** CVD set-up; 1,2 - twin furnace, first (max. 500 °C) and second part (max. 1200 °C), 3 – substrate with  $\text{Cr}(\text{acac})_3$ , 4 – substrates for deposits, 5 – valve, 6 – pressure gauge, 7 – gate valve.