Supporting Information

Facile Synthesized ZnO Microcrystals for Random Microlaser and Incandescent-type Source

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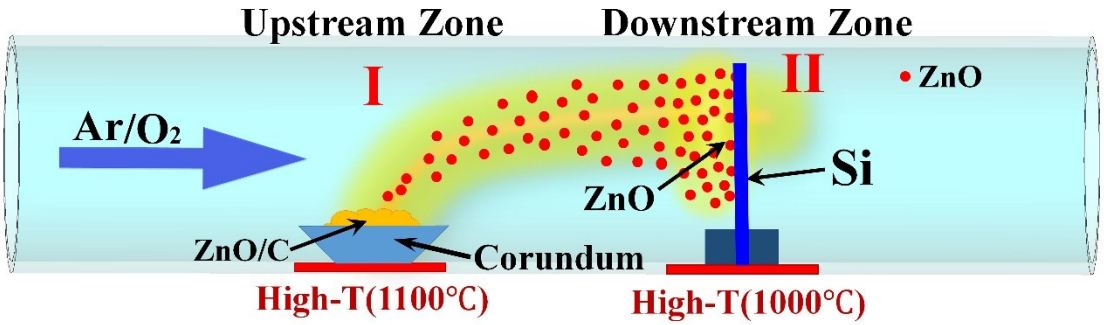

Figure S1. Schematic diagram of the prepared procedure of ZnO MCs.

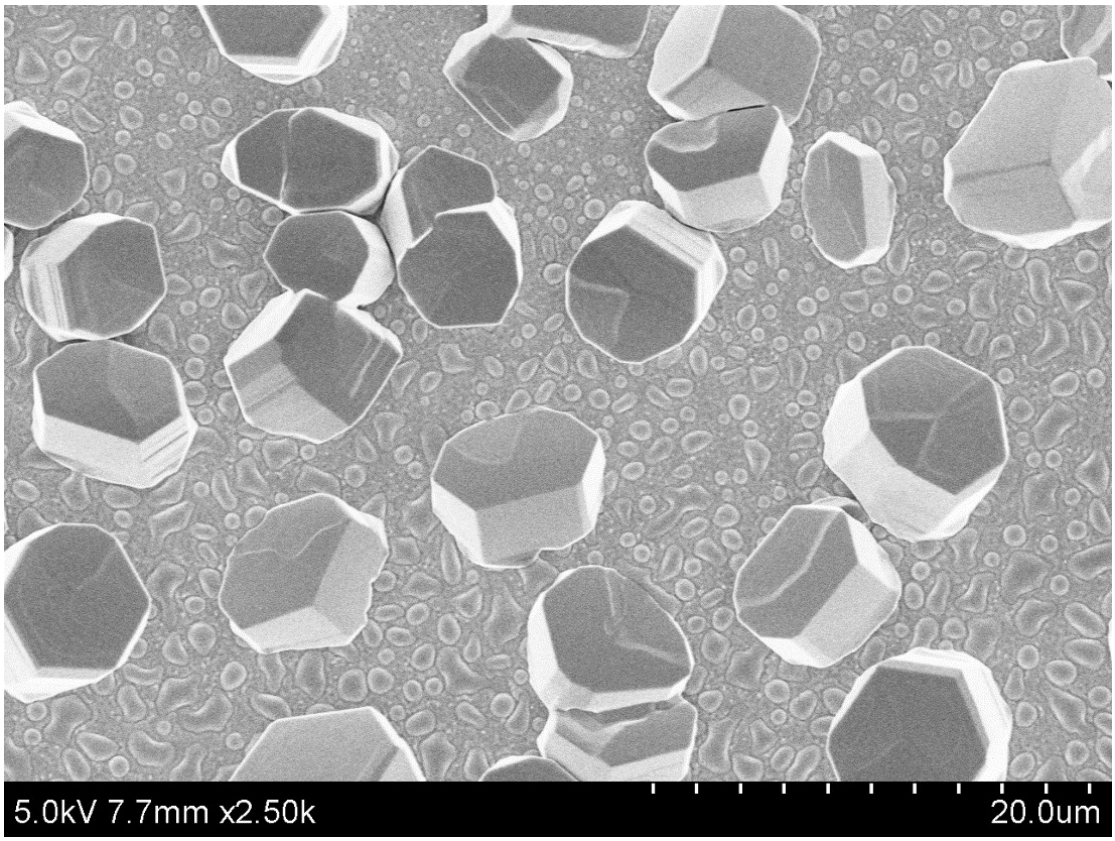

Figure S2. The as-synthesized ZnO MCs, which deposited on the Si-substrate.

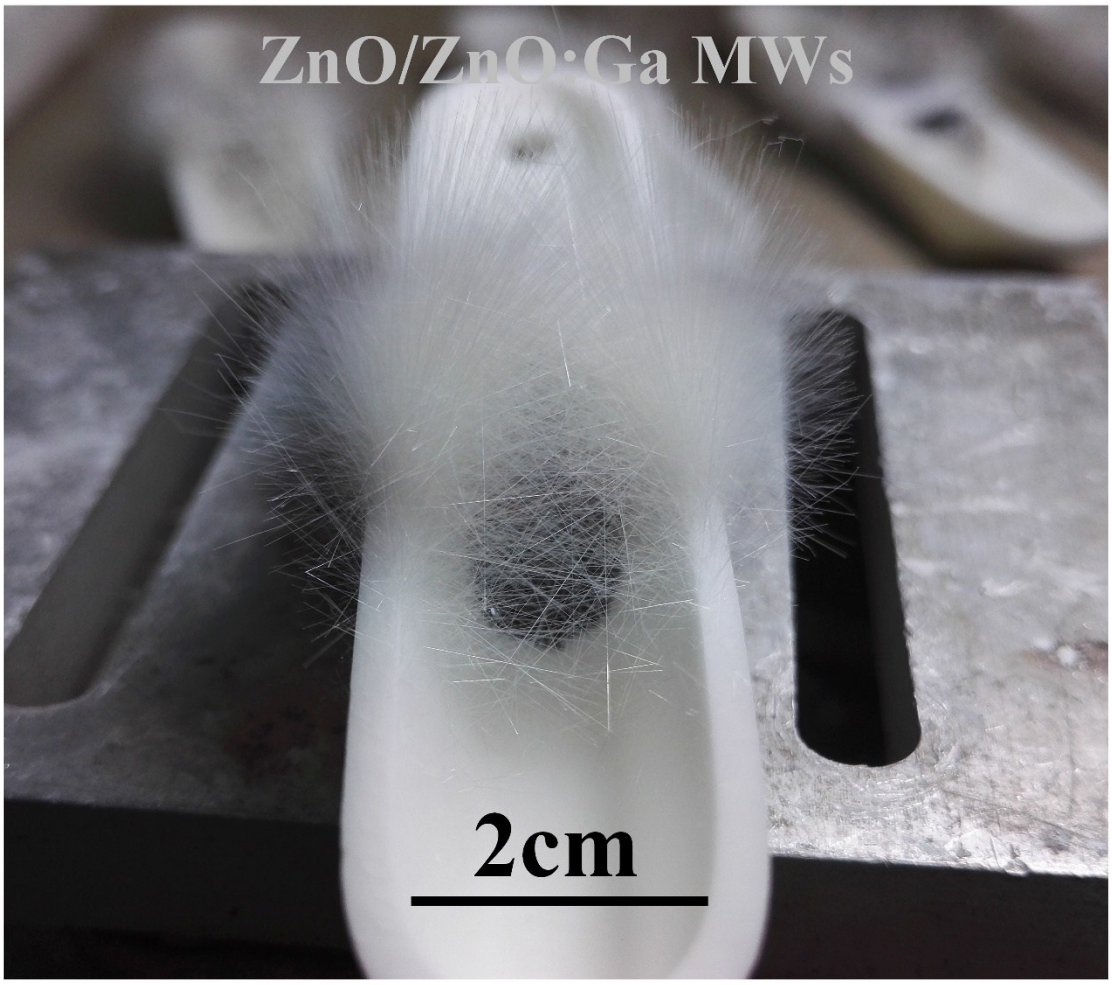

Figure S3. Optical photograph of the as-synthesized ZnO/ZnO:Ga MWs.

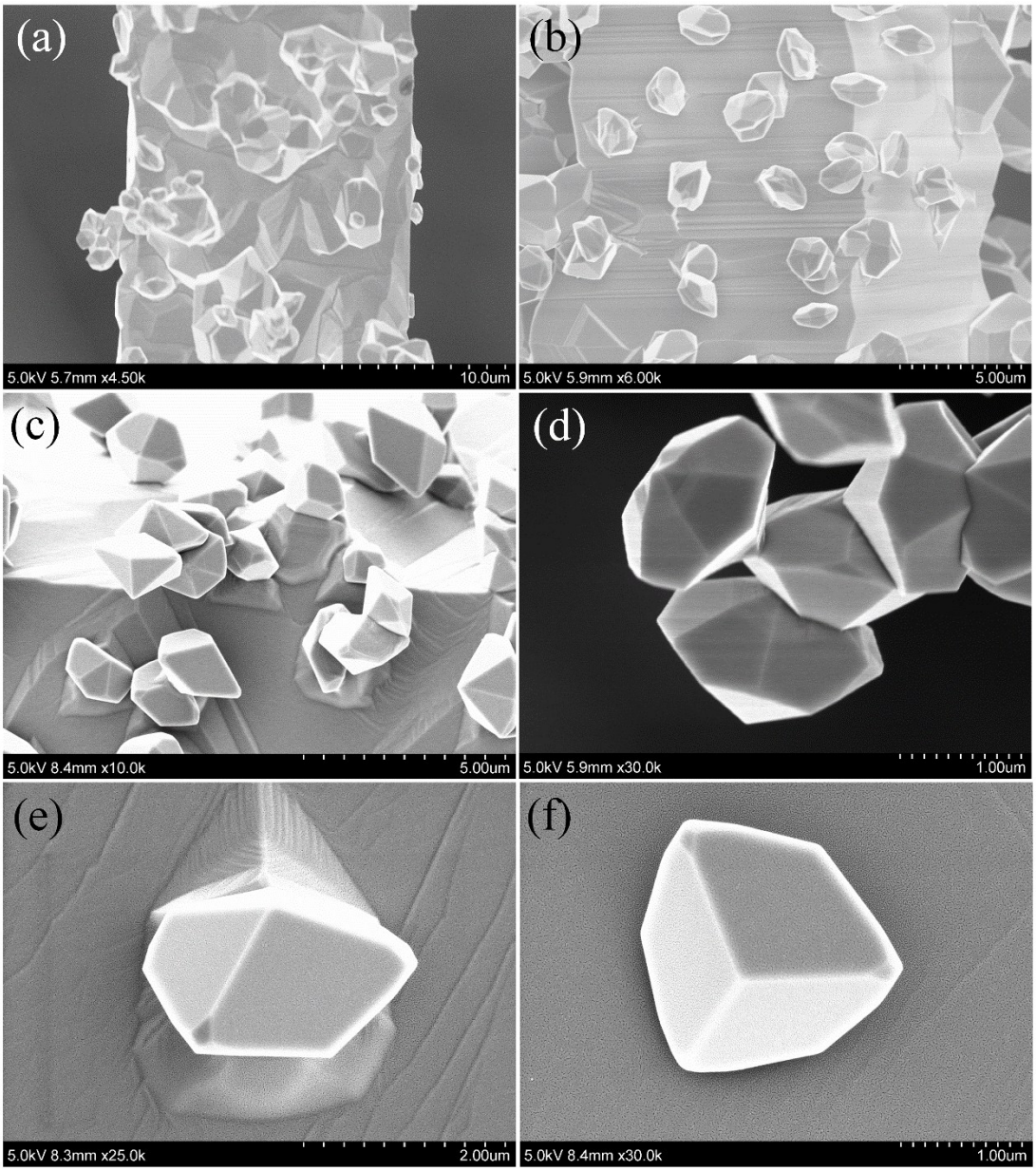

Figure S4. (a)-(c) SEM images of single ZnO:Ga MWs prepared with ZnO MCs decoration. (d)-(f) The amplified SEM images of the as-synthesized ZnO microcrystals, which deposited on the pre-synthesized ZnO:Ga MWs.

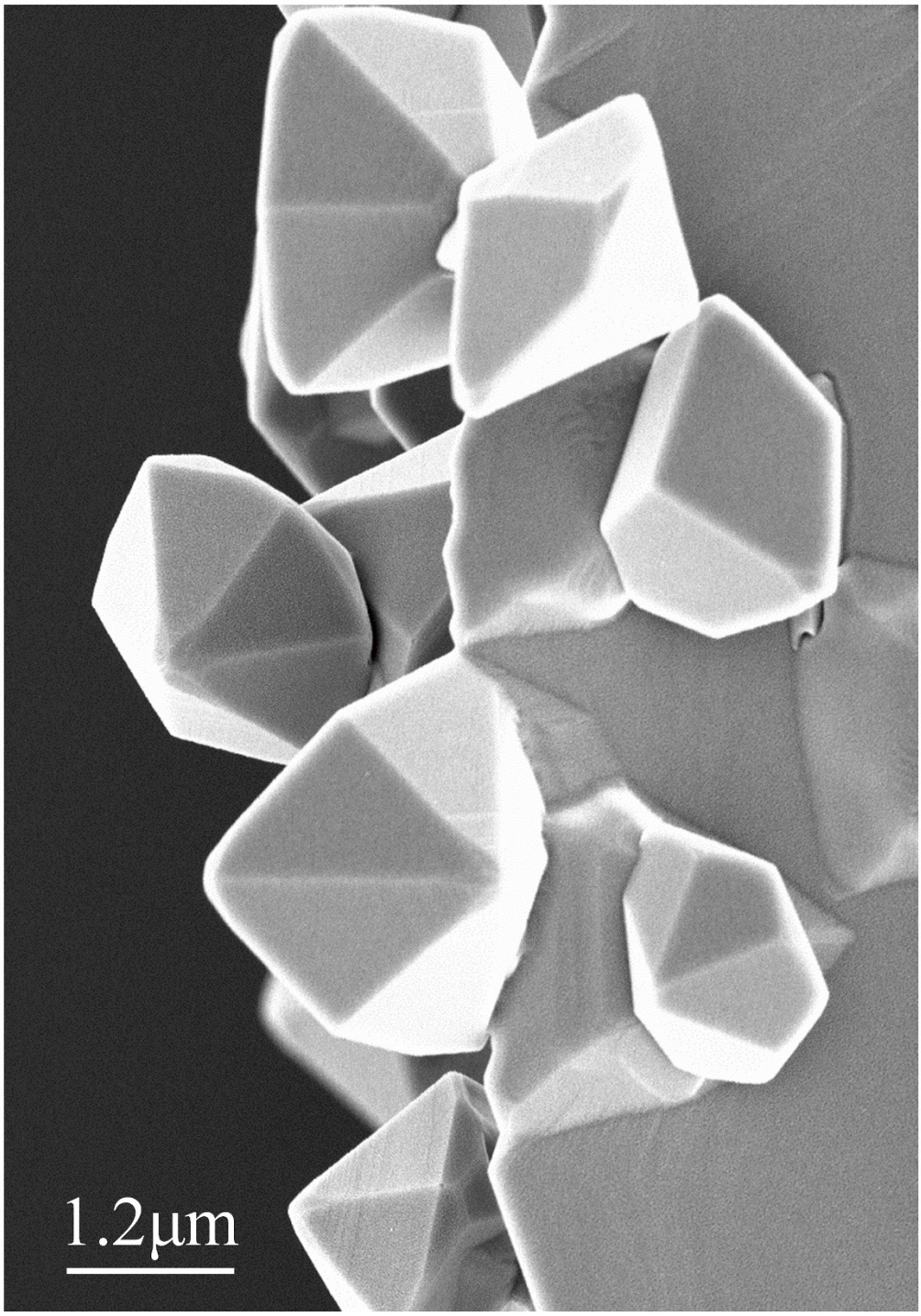

Figure S5. Amplified SEM image of the synthesized ZnO MCs, which deposited on the pre-synthesized ZnO:Ga MW.

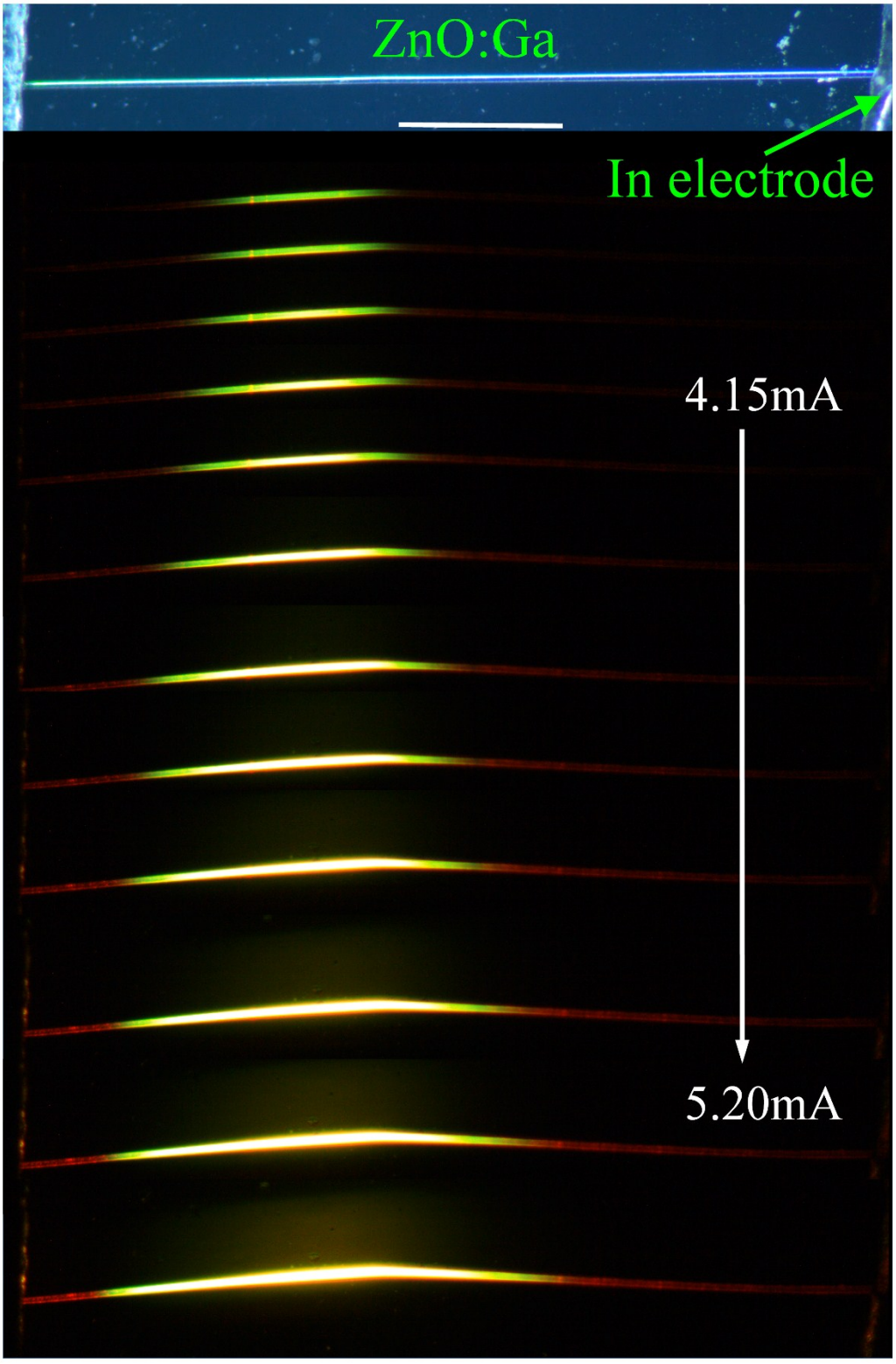

Figure S6. Bright and green light-emitting from electrically driven single bare ZnO:Ga MW based fluorescent emitter. The bright emission regions located towards the center of the wire (scale bar: 250 μm).

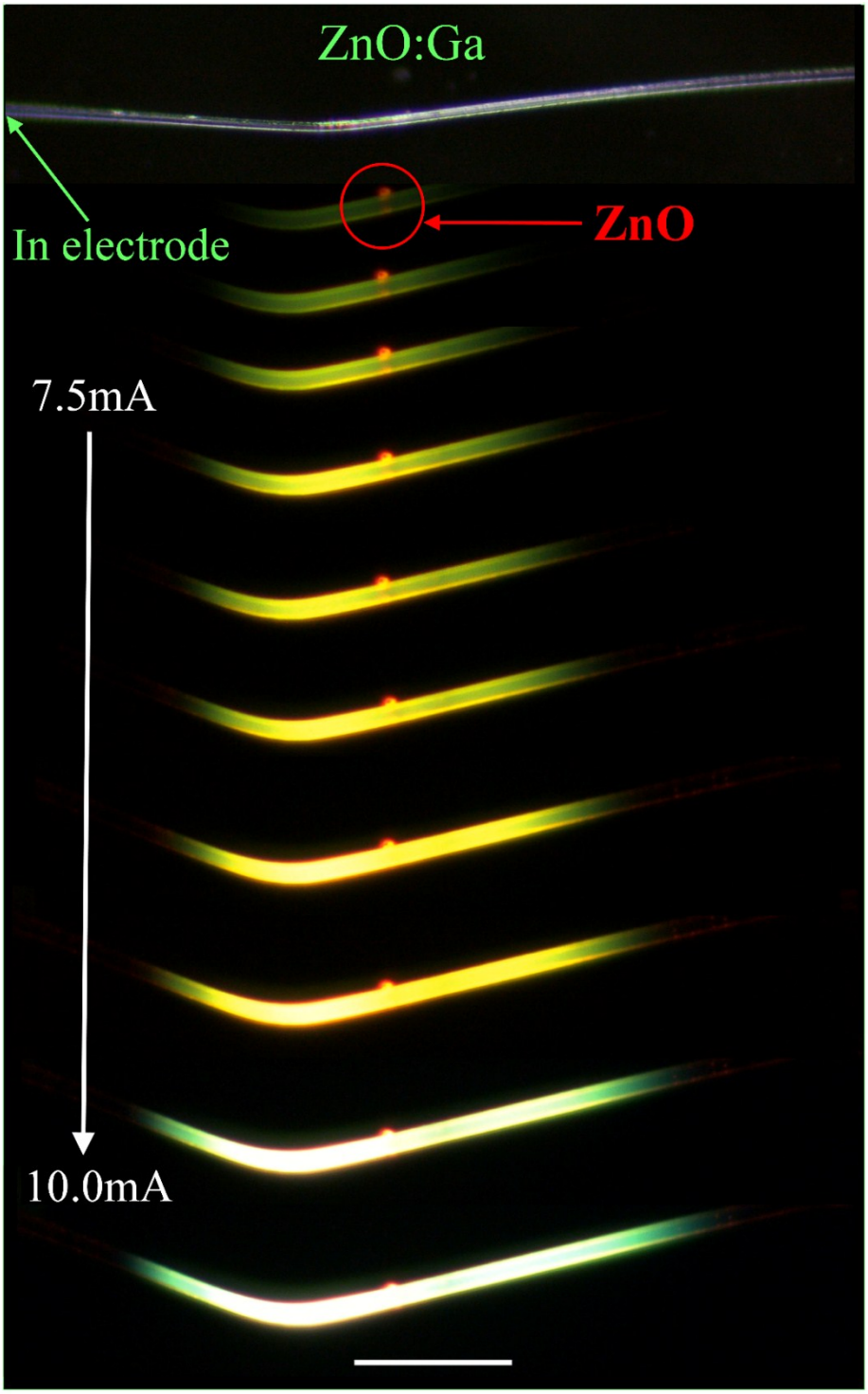

Figure S7. Light-emitting from electrically biased single ZnO:Ga MW, with a ZnO MC deposited on the wire. With increasing the injection current, bright and green lighting can be captured, accompanied by a single red spot appeared in the light-emitting region. It can be attributed to the synthesized ZnO MC deposited on the pre-synthesized ZnO:Ga MW (scale bar: 150 μm).

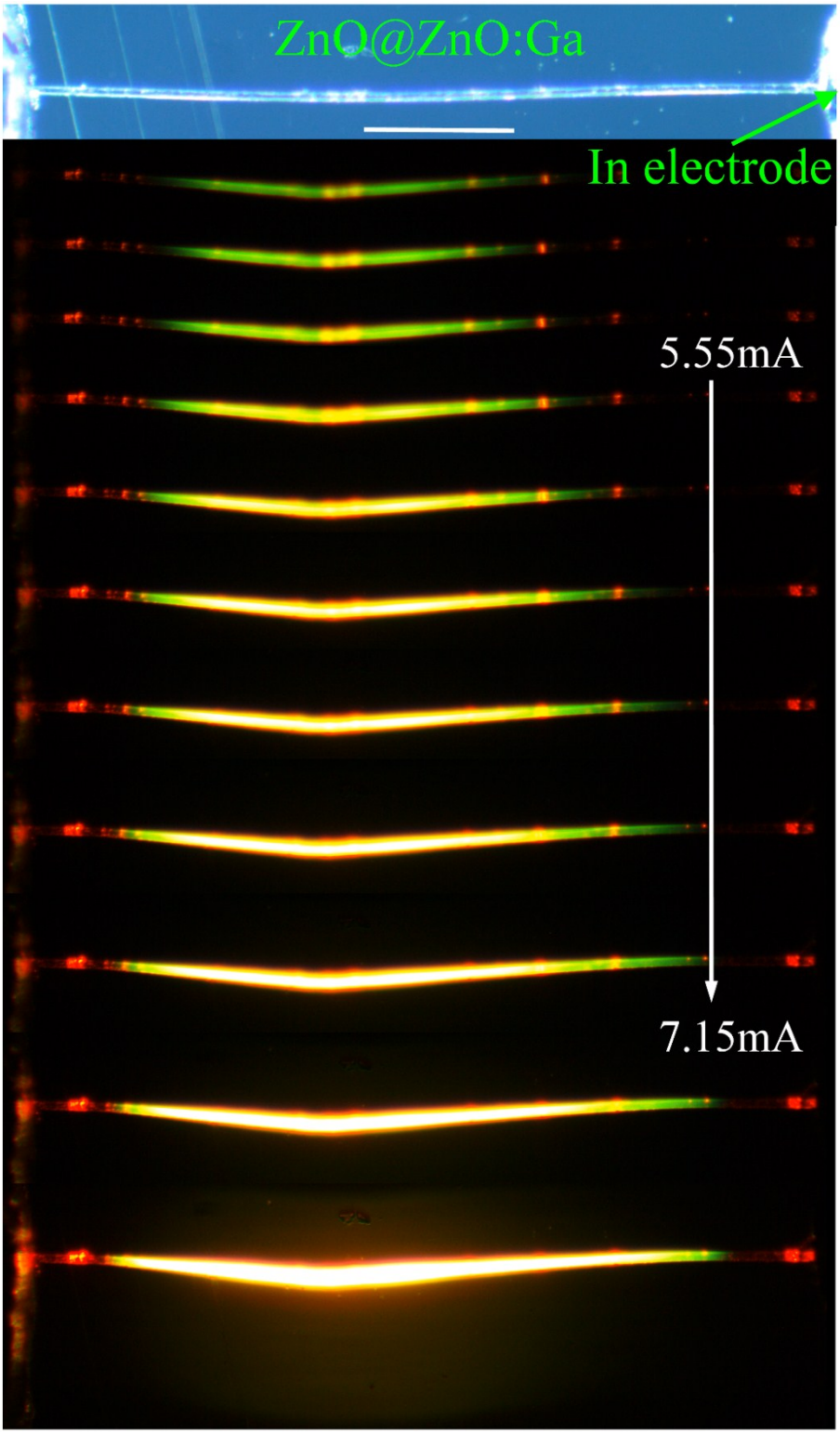

Figure S8. Light-emitting from electrically biased single ZnO/ZnO:Ga MW based incandescent source. Several red spots can also be captured in the green light-emitting region. Certainly, the red speckled lighting can also be attributed to the as-synthesized ZnO MCs, which deposited on the pre-synthesized ZnO:Ga MW (scale bar: 150 μm).

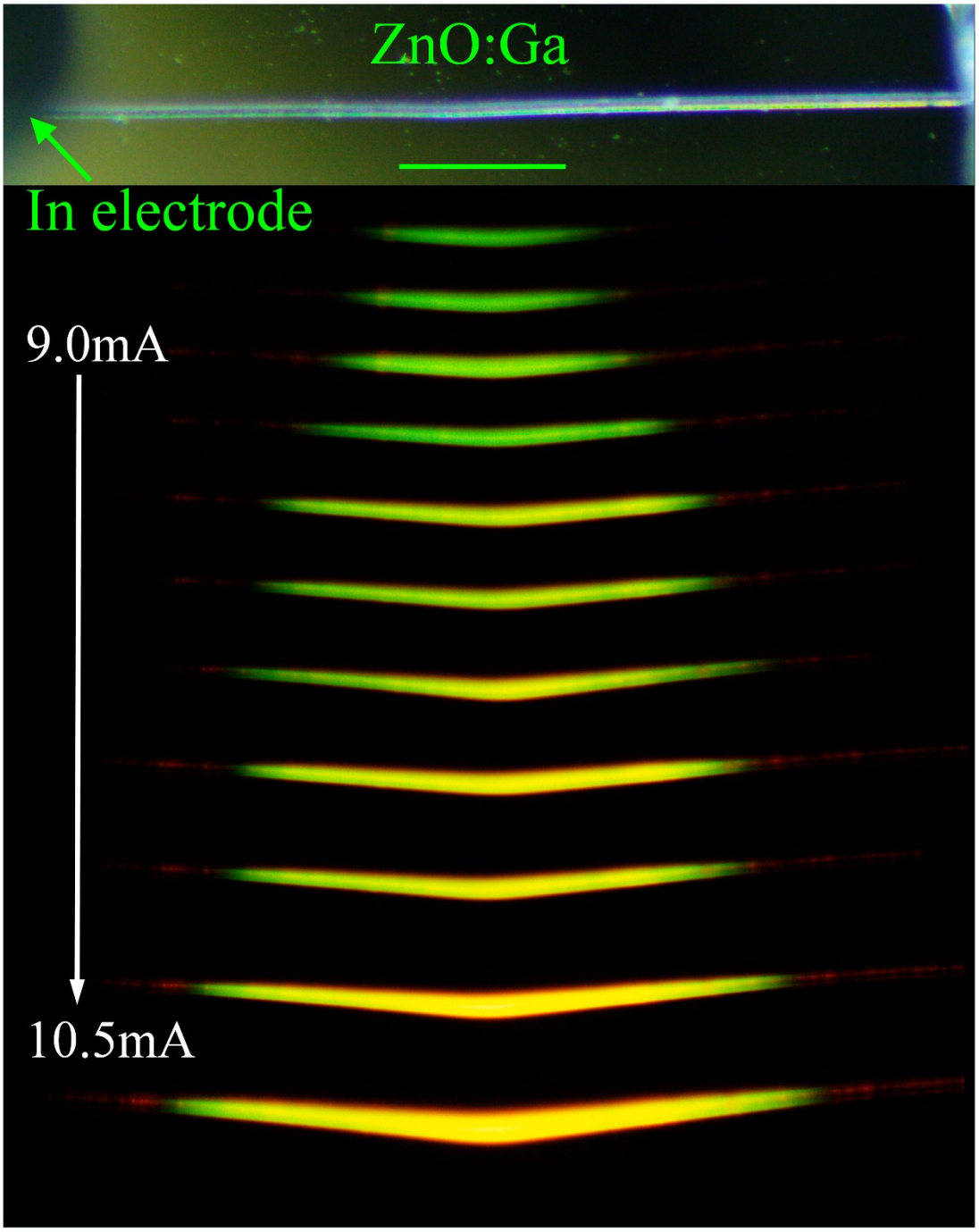

Figure S9. Bright and green light-emitting from electrically biased single bare ZnO:Ga MW based fluorescent emitter. The bright emission regions located towards the center of the wire (scale bar: 150 μm).

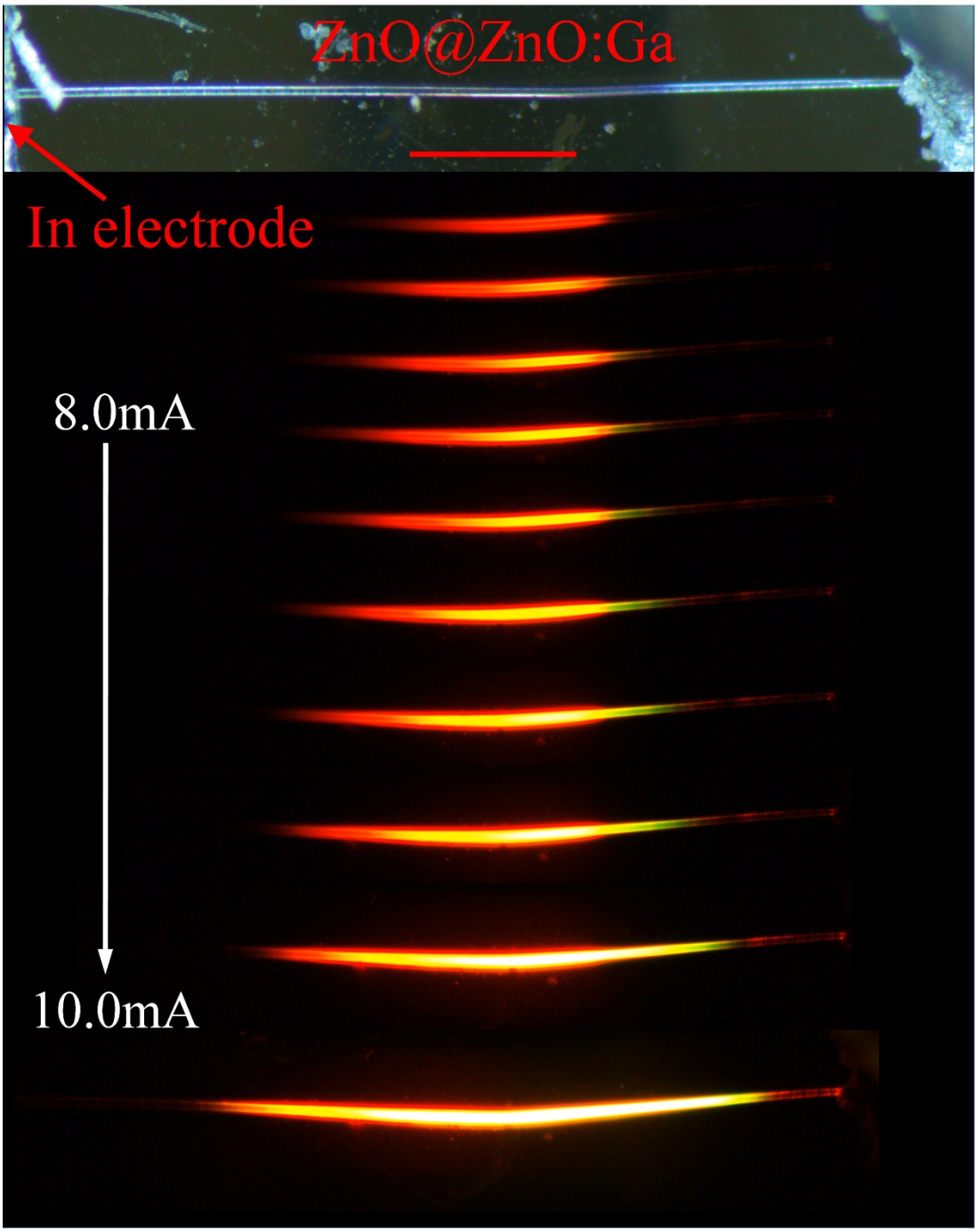

Figure S10. By comparison, light-emitting from electrically biased single ZnO:Ga MW prepared with ZnO microcrystals decoration based fluorescent emitter (scale bar: 150 μm). The emission regions located towards the center of the wire. The weight ratio of the precursor mixture of ZnO : C = 1 : 1, with corresponding weight denoted as 2 g.

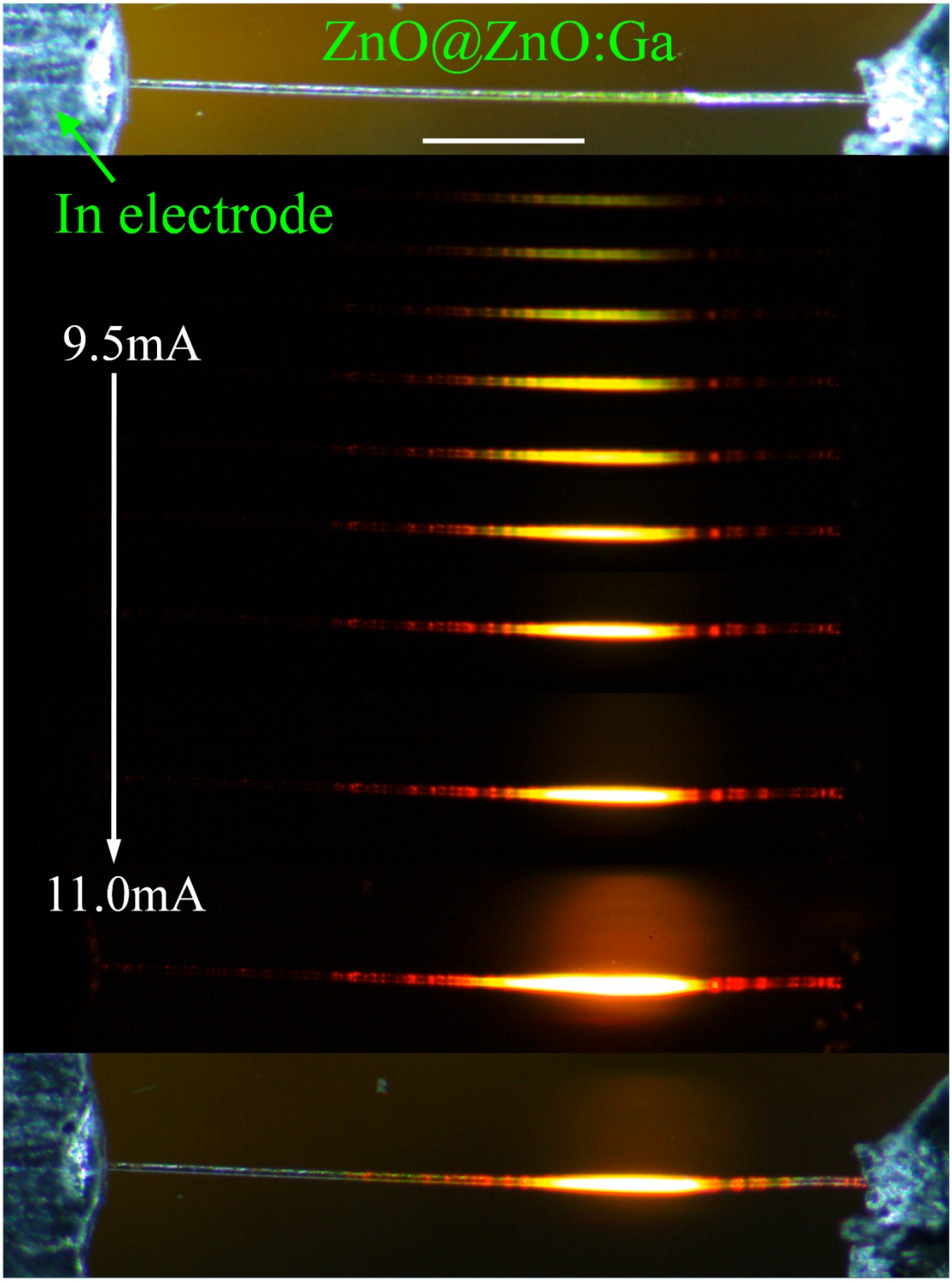

Figure S11. A single ZnO/ZnO:Ga MW selected from Sample-1 was employed to construct fluorescent filament light source. With increasing the injection current ranging from 9.5 to 10.0 mA, bright and visible lighting can be observed. Meanwhile, a series of locating red-lighting spots can also be recorded, which located at the lighting region of the wire (scale bar: 200 μm).

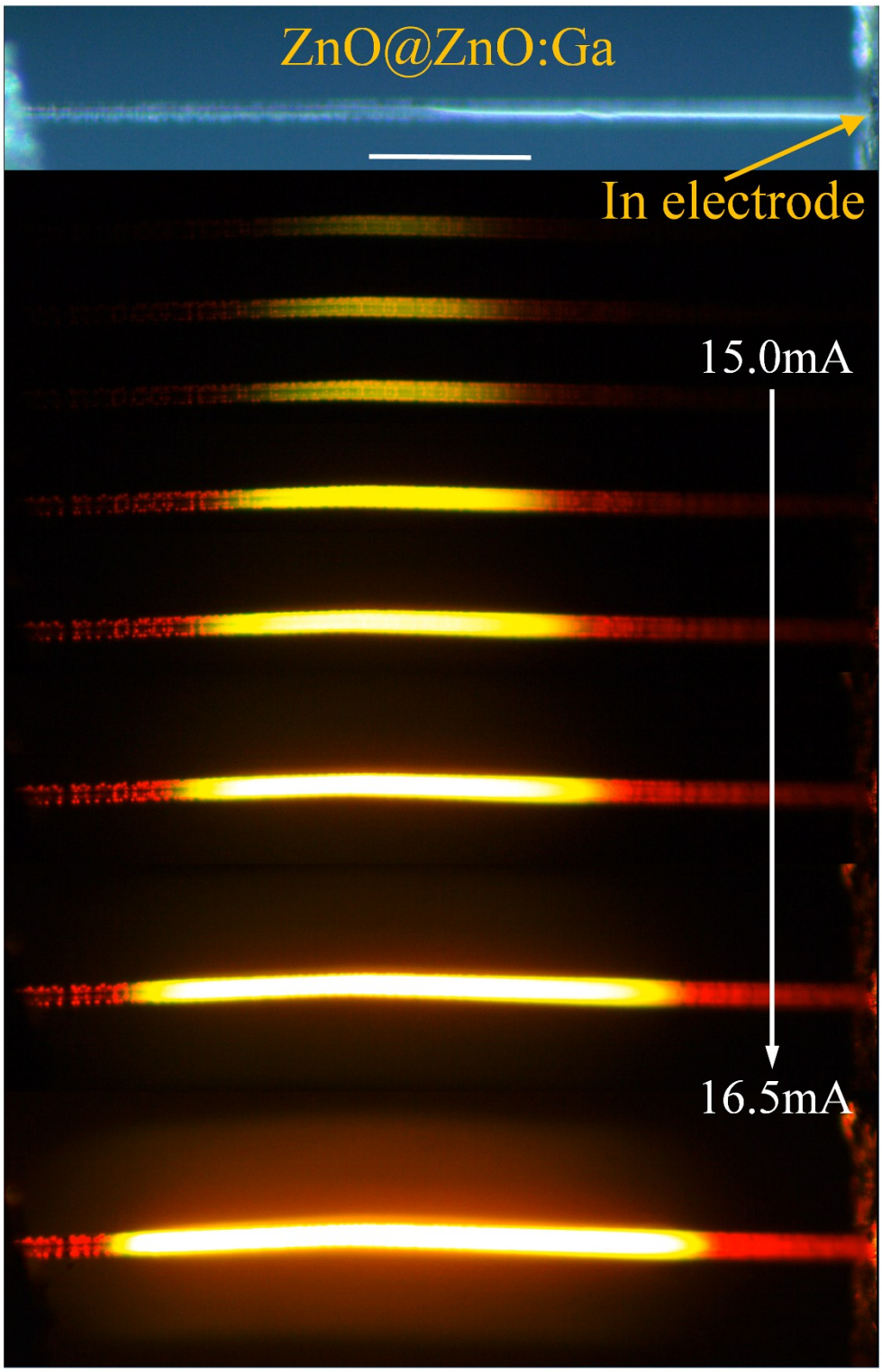

Figure S12. A single ZnO/ZnO:Ga MW selected from Sample-2 was utilized to construct fluorescent filament lamp. With the injection current ranging from 15.0 to 16.5 mA, bright and visible emissions can be collected, with the lighting regions located towards the center of the wire (scale bar: 120 μm).

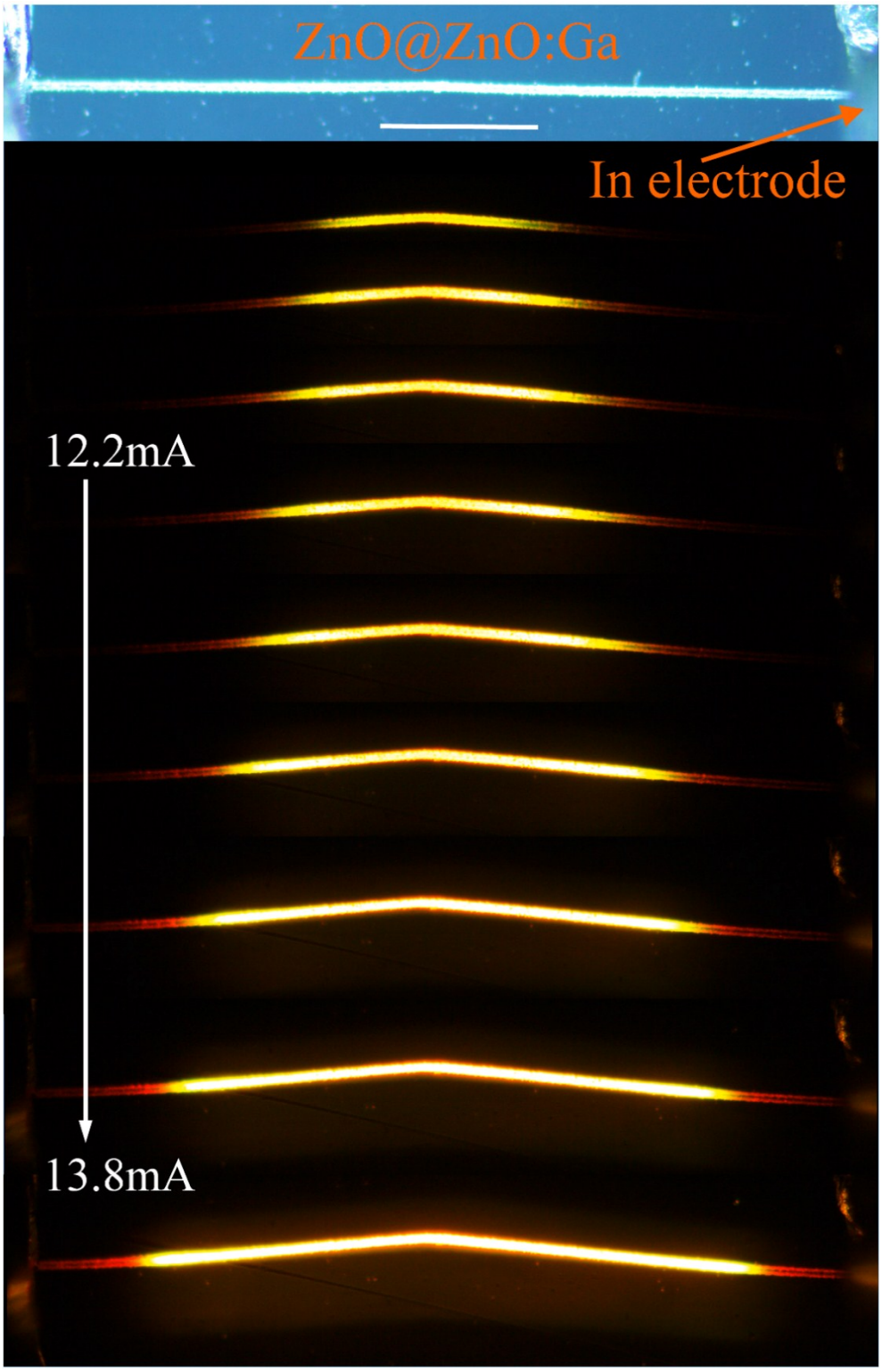

Figure S13. A single ZnO/ZnO:Ga MW selected from Sample-3 was utilized to construct fluorescent filament lamp. With the injection current ranging from 12.2 to 13.8 mA, bright and visible emissions can be collected, with the lighting regions located towards the center of the wire (scale bar: 200 μm).

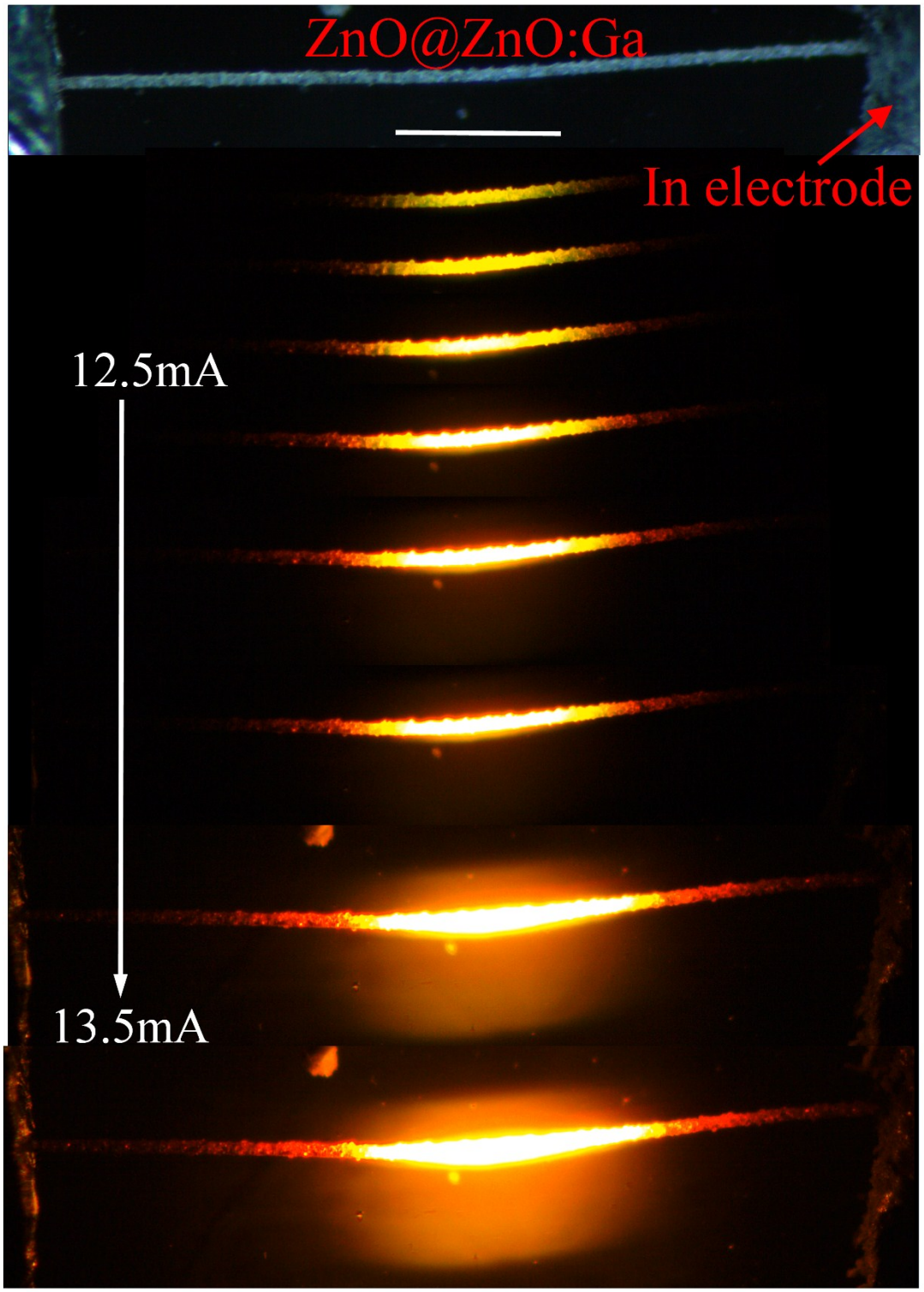

Figure S14. A single ZnO/ZnO:Ga MW selected from Sample-4 was utilized to construct fluorescent filament lamp. With the injection current ranging from 12.5 to 13.5 mA, bright and visible emissions can be collected, with the lighting regions located towards the center of the wire (scale bar: 150 μm).

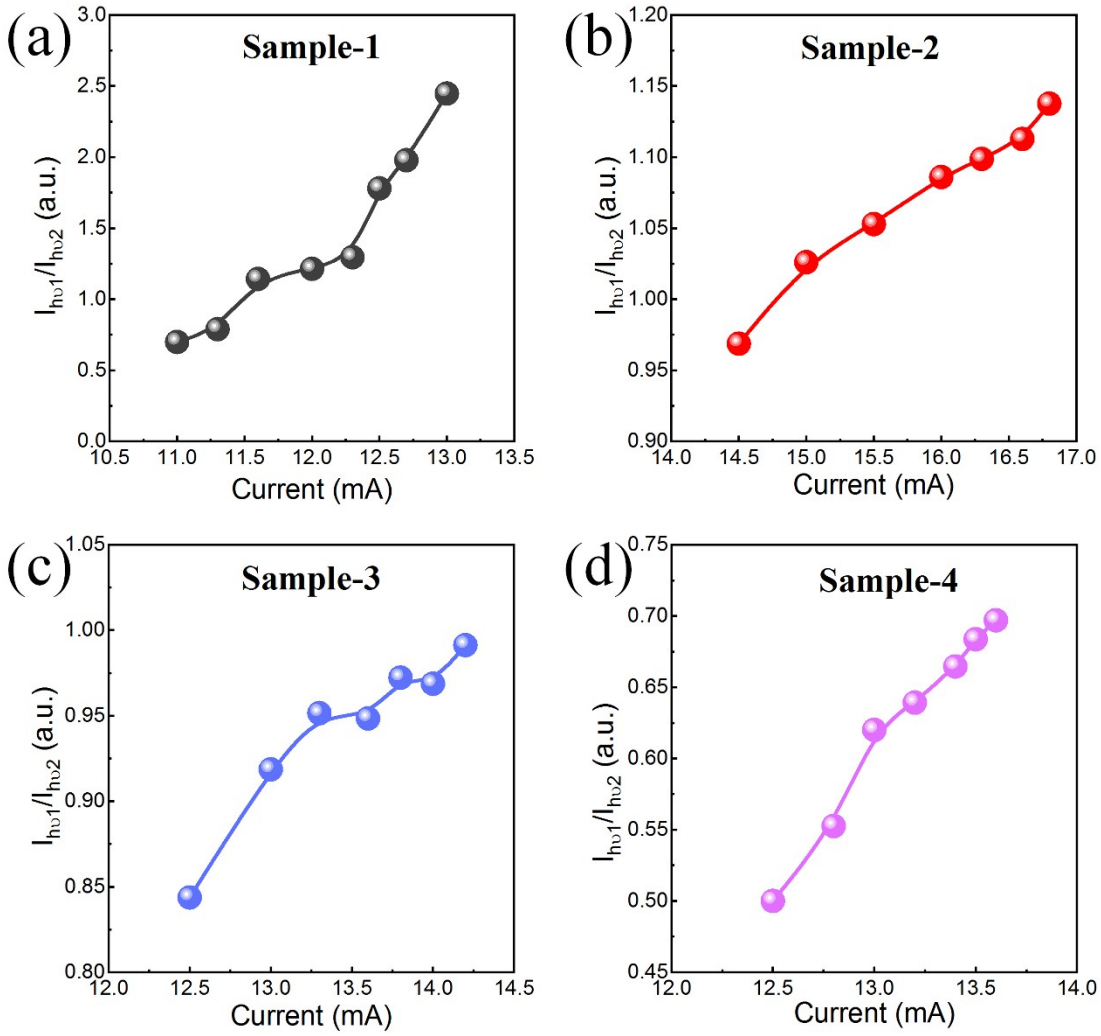

Figure S15. The emission ratios denoted as $I_{hυ1}/I_{hυ2}$ from the selected samples, (a) for Sample-1, (b) for Sample-2, (c) for Sample-3, and (d) for Sample-4.