Polyethylene glycol-assisted hydro-solvothermal growth of anisotropic magnetic iron oxides: the role of mixed environment conditions

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SUPPLEMENTARY INFORMATION

S1. SEM Morphological characterizations

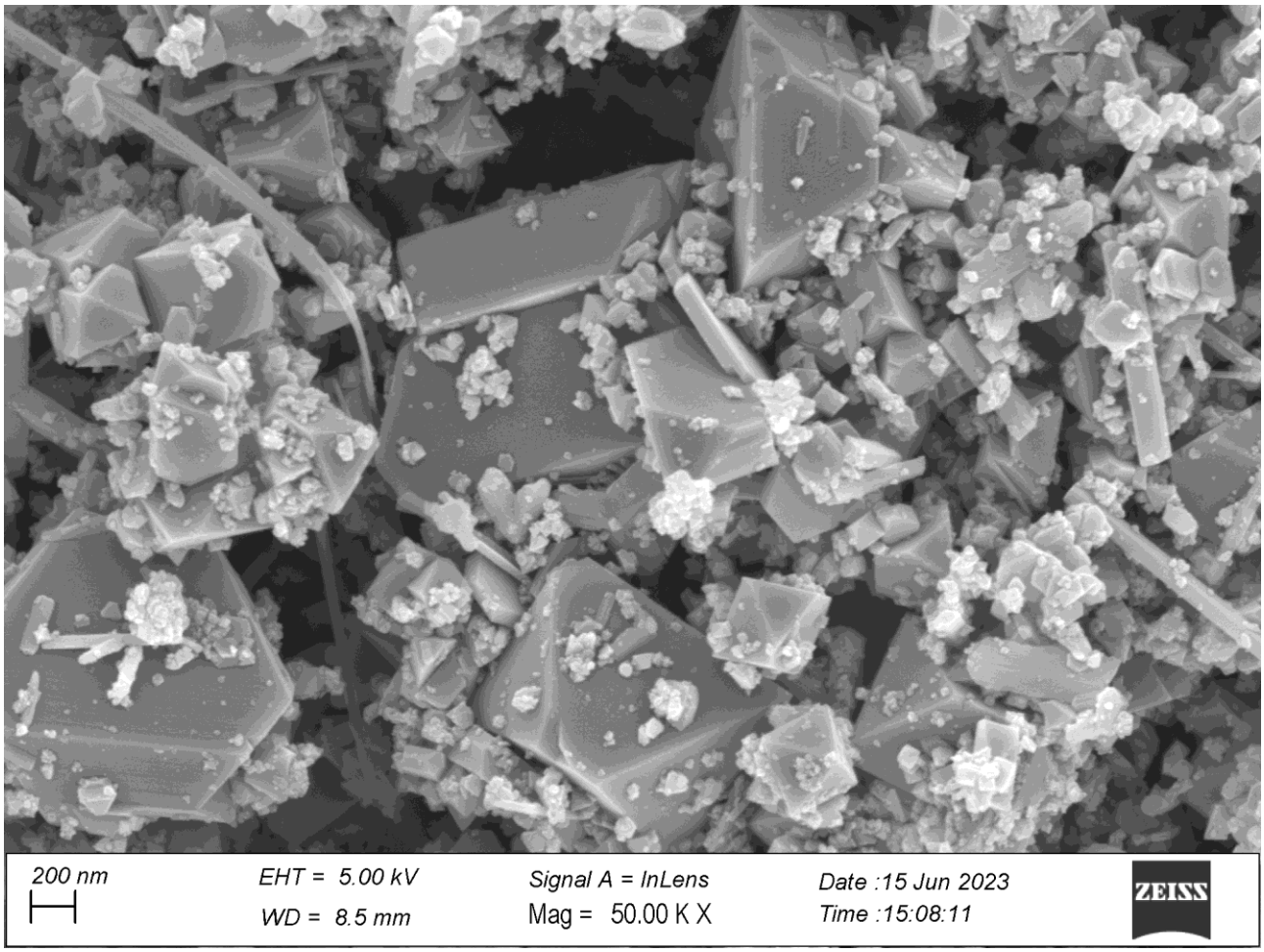

Fig. S1. SEM micrograph of sample S-01 (reaction medium: water/PEG400 100/0) at high magnifications.

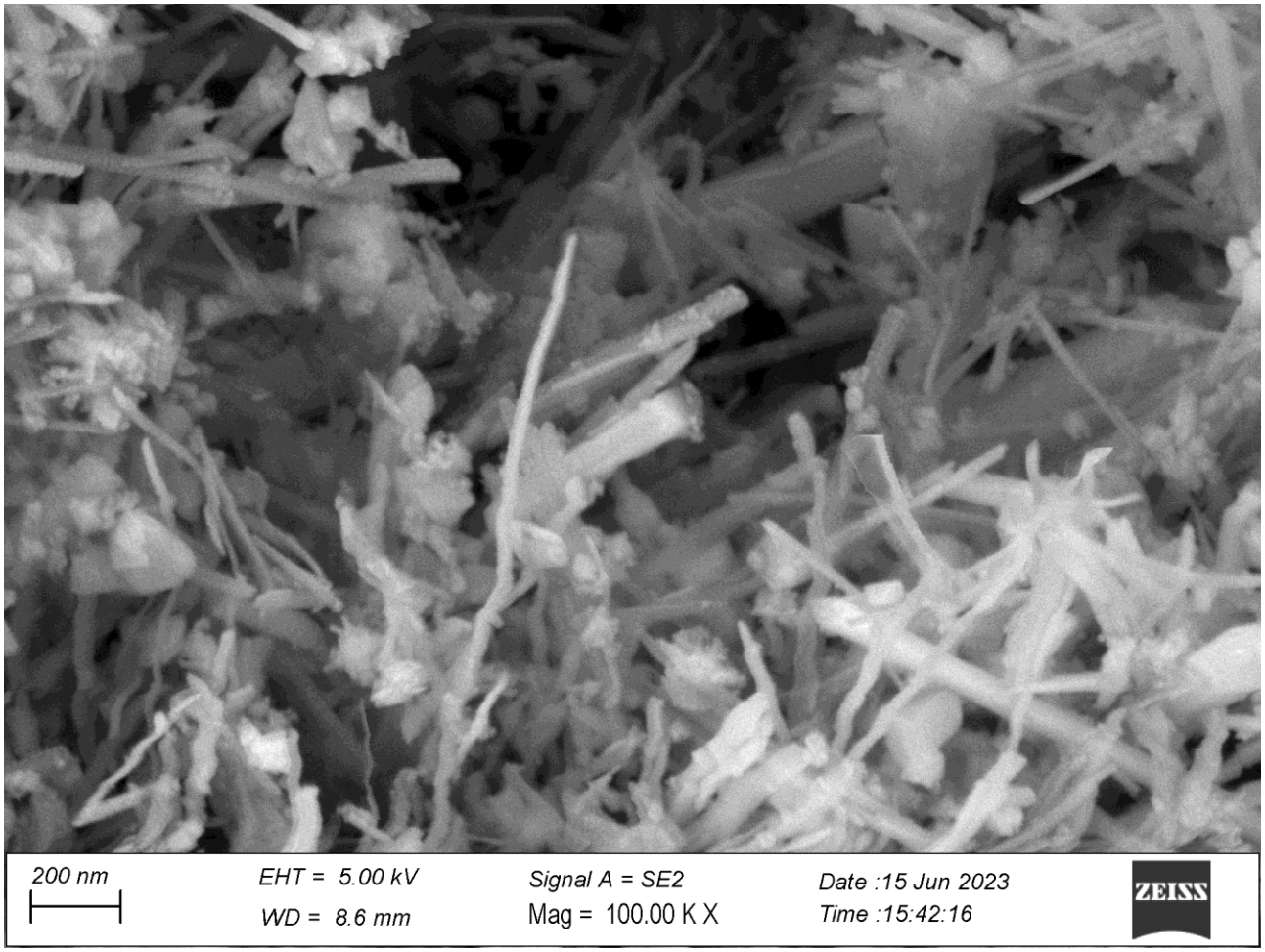

Fig. S2. SEM micrograph of sample S-02 (reaction medium: water/PEG400 75/25) at high magnifications.

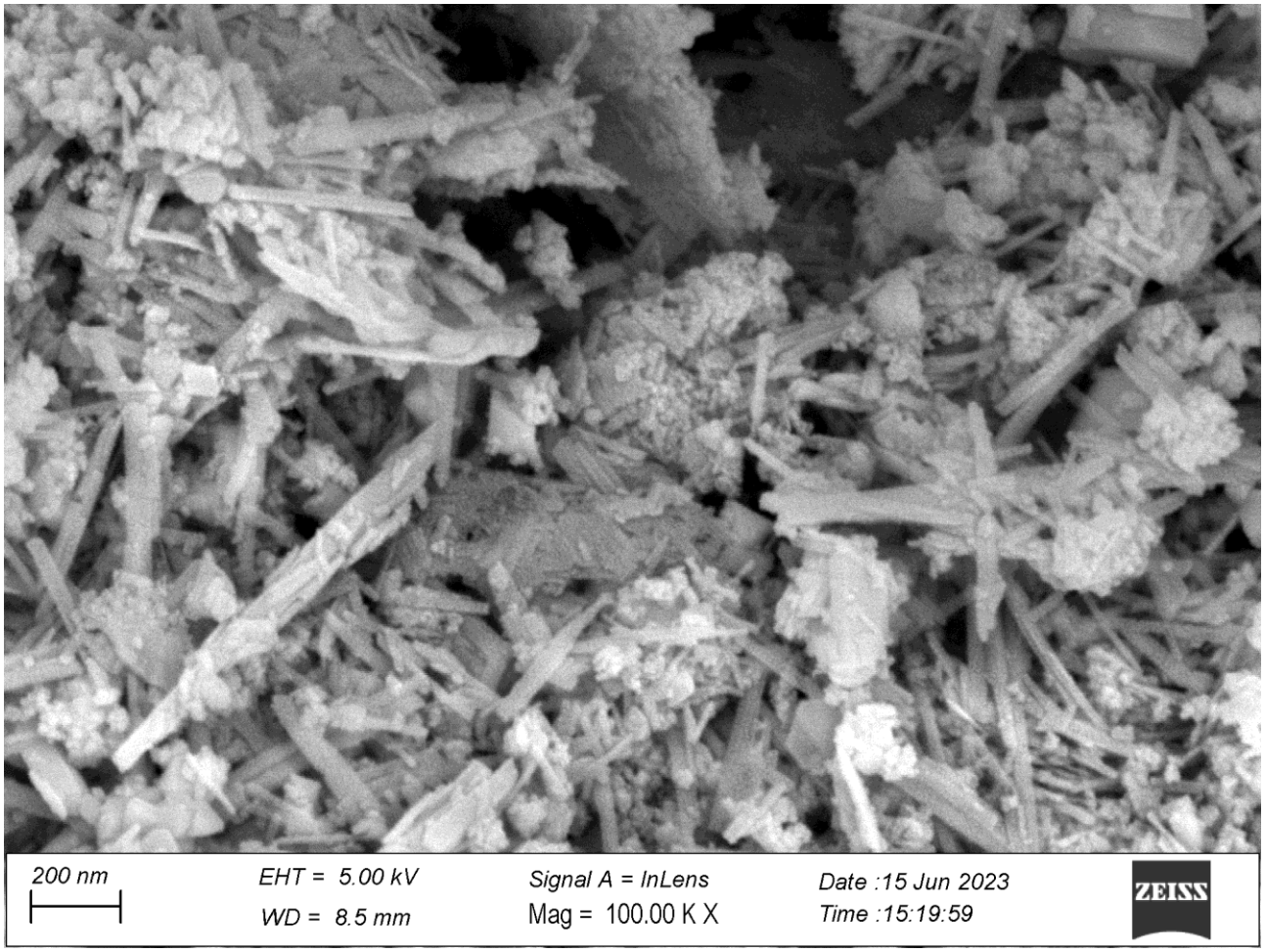

Fig. S3. SEM micrograph of sample S-03 (reaction medium: water/PEG400 50/50) at high magnifications.

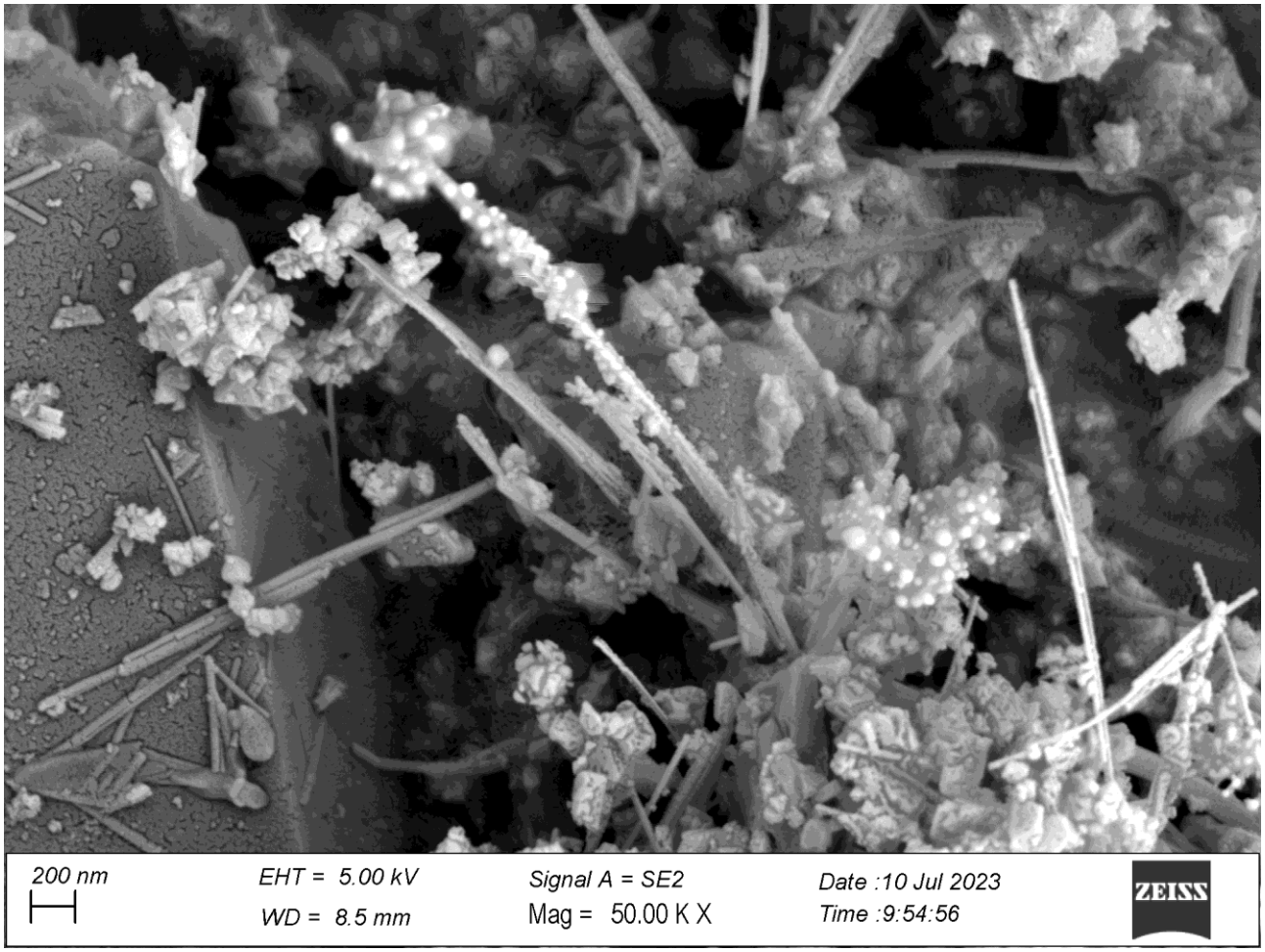

Fig. S4. SEM micrograph of sample S-04 (reaction medium: water/PEG400 25/75) at high magnifications.

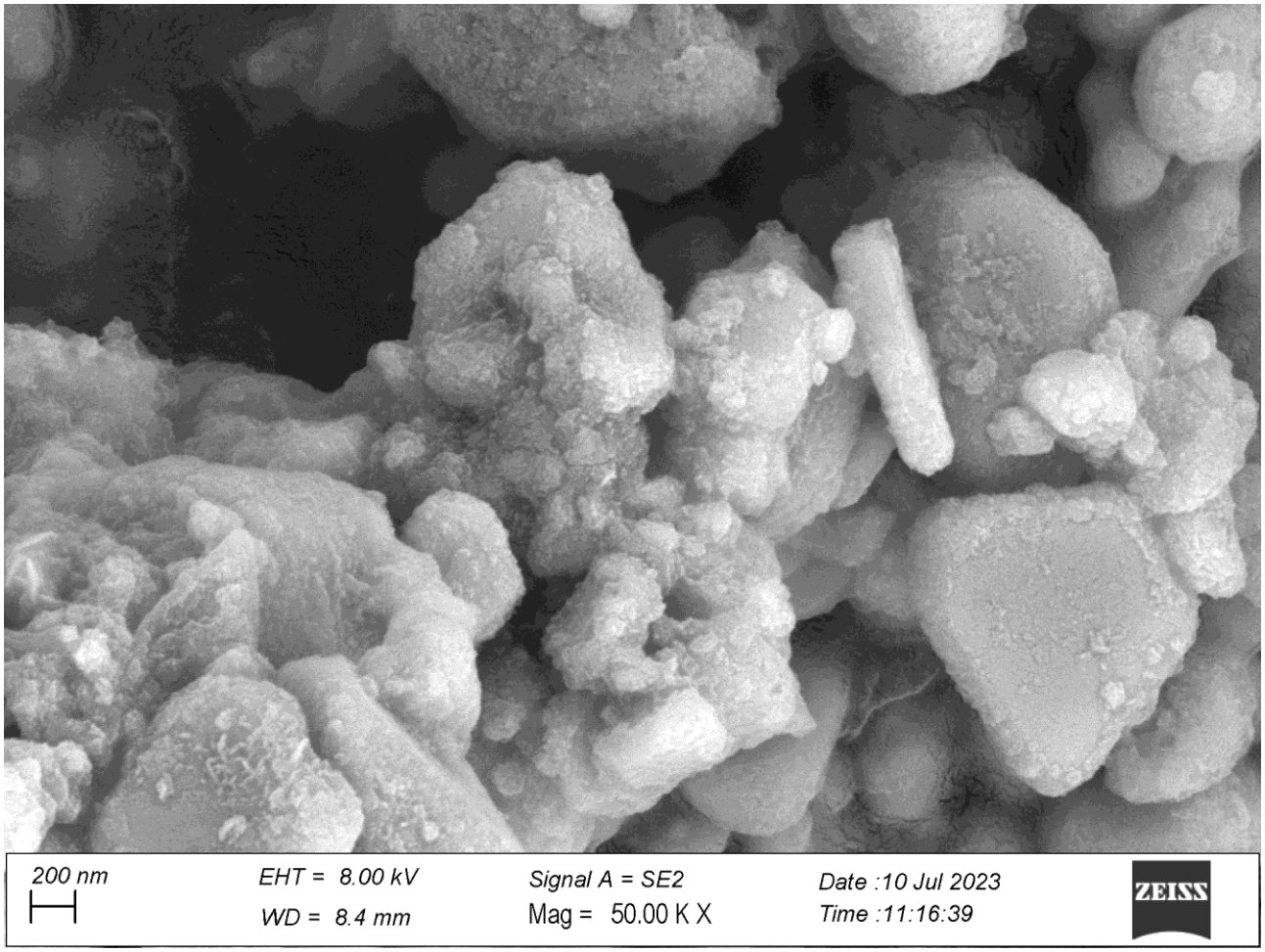

Fig. S5. SEM micrograph of sample S-05 (reaction medium: 2-propanol/PEG400 100/0) at high magnifications.

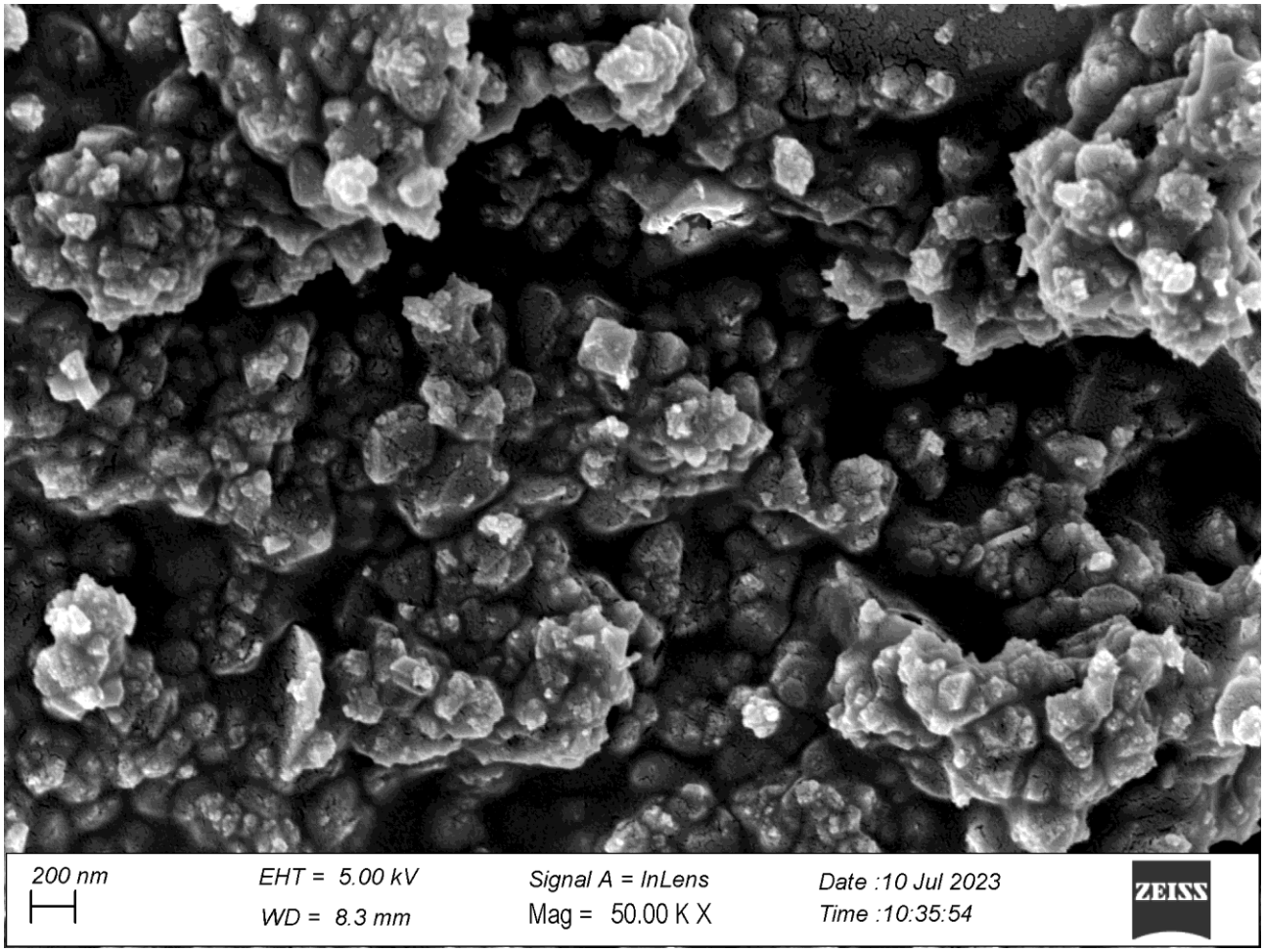

Fig. S6. SEM micrograph of sample S-06 (reaction medium: 2-propanol/PEG400 75/25) at high magnifications.

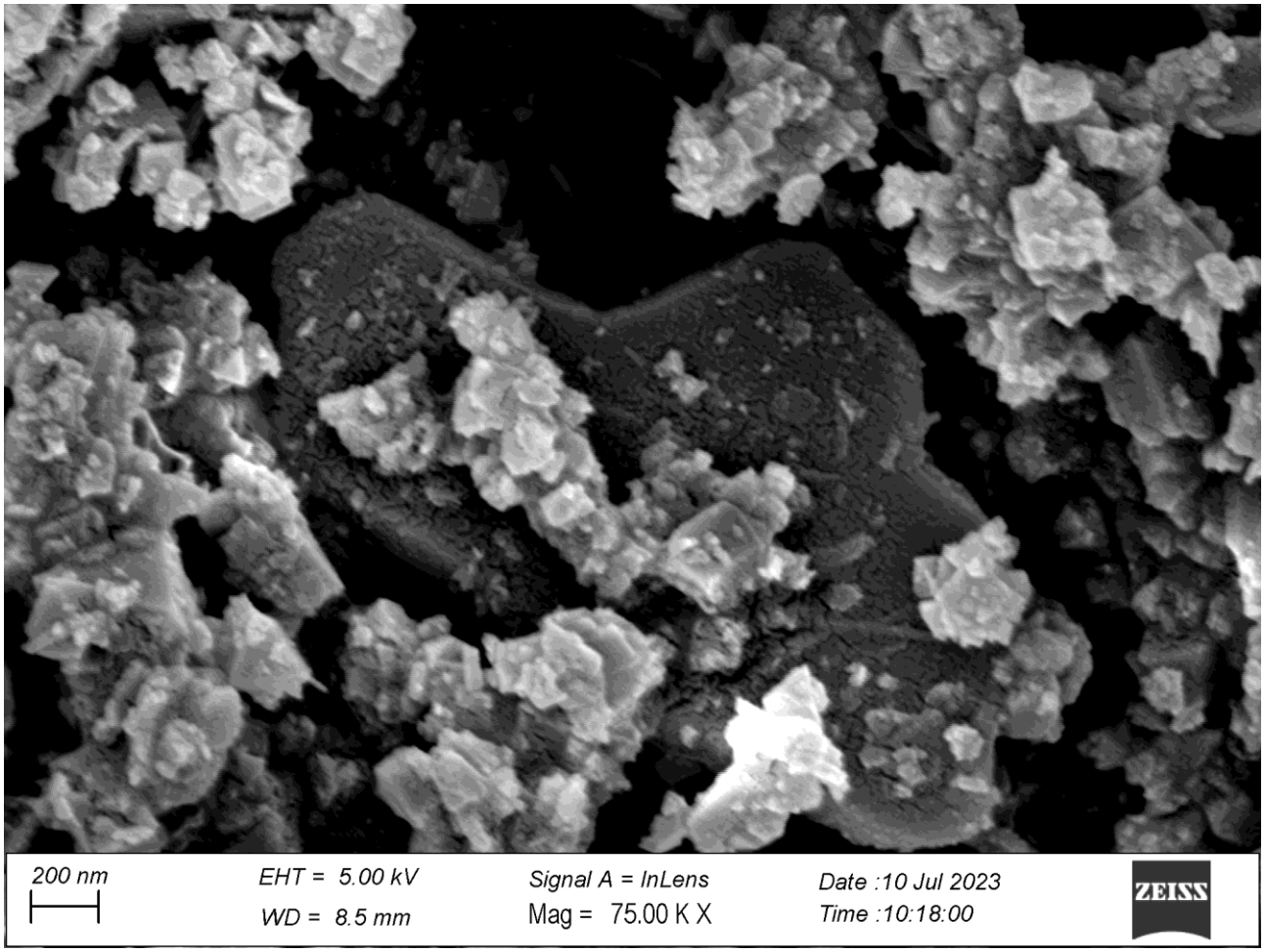

Fig. S7. SEM micrograph of sample S-07 (reaction medium: 2-propanol/PEG400 50/50) at high magnifications.

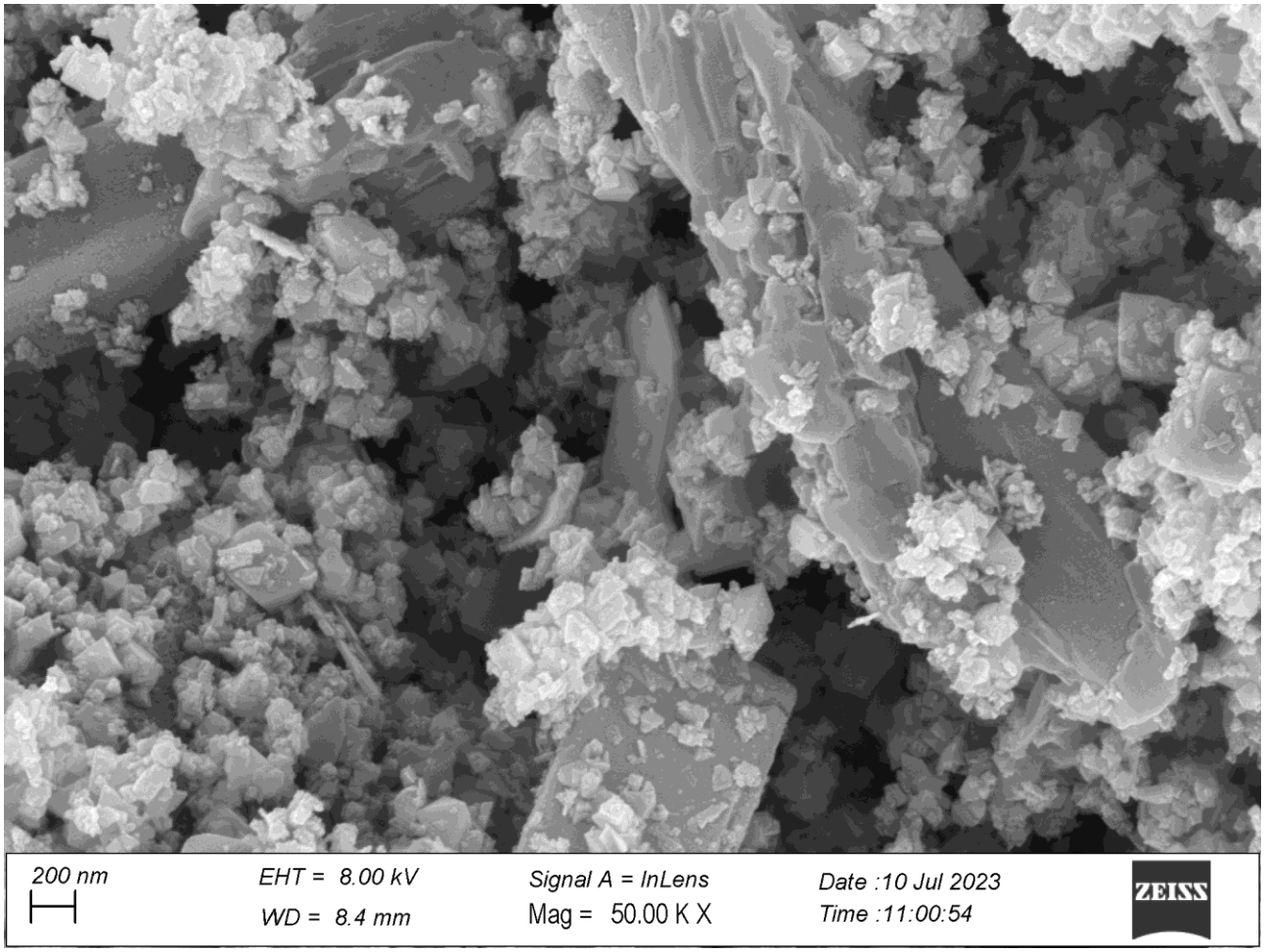

Fig. S8. SEM micrograph of sample S-08 (reaction medium: 2-propanol/PEG400 25/75) at high magnifications.

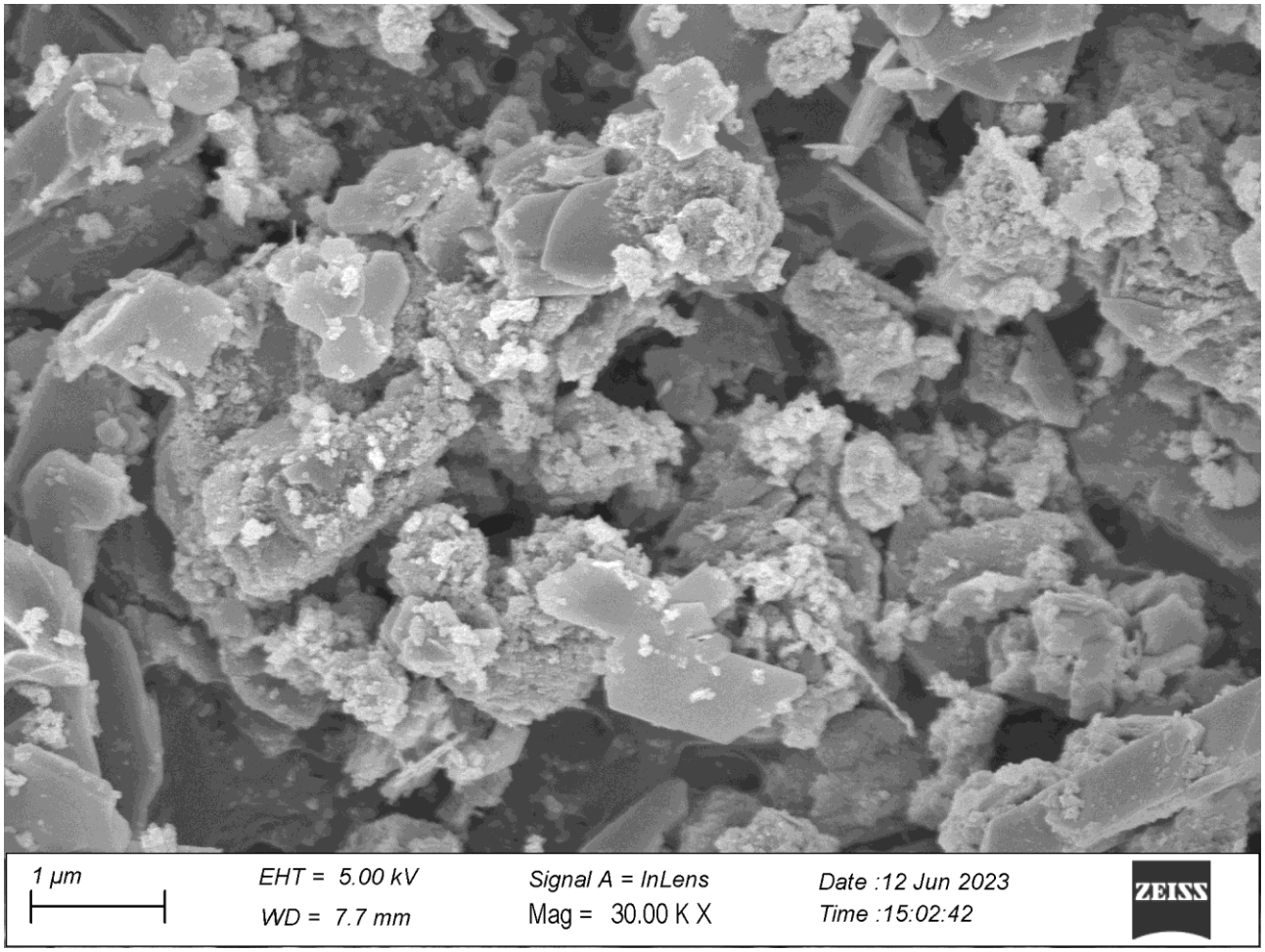

Fig. S9. SEM micrograph of S-09 sample (reaction medium: water/2-propanol/PEG400 37.5/12.5/50) at high magnifications.

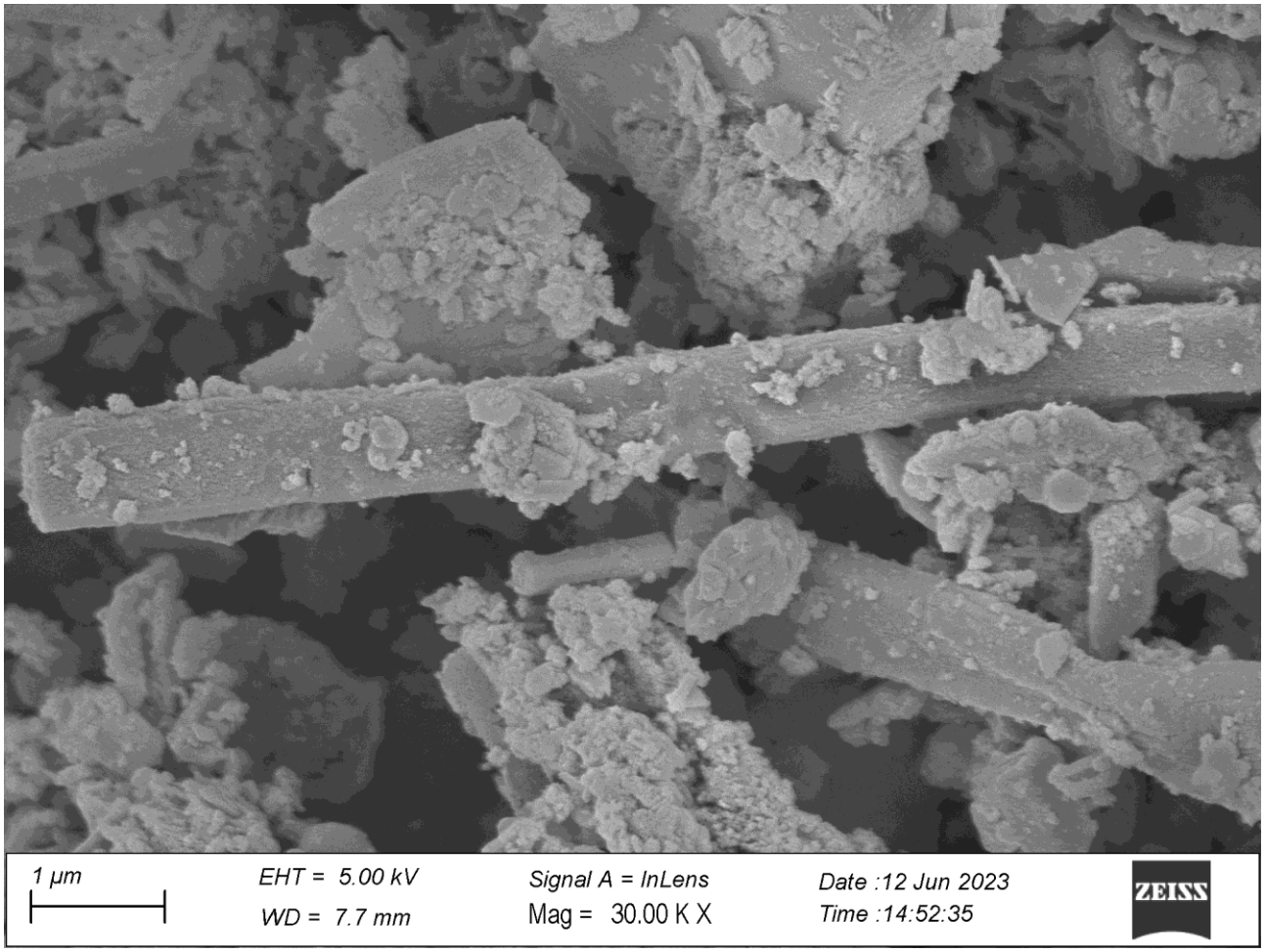

Fig. S10. SEM micrograph of S-10 sample (reaction medium: water/2-propanol/PEG400 25/25/50) at high magnifications.

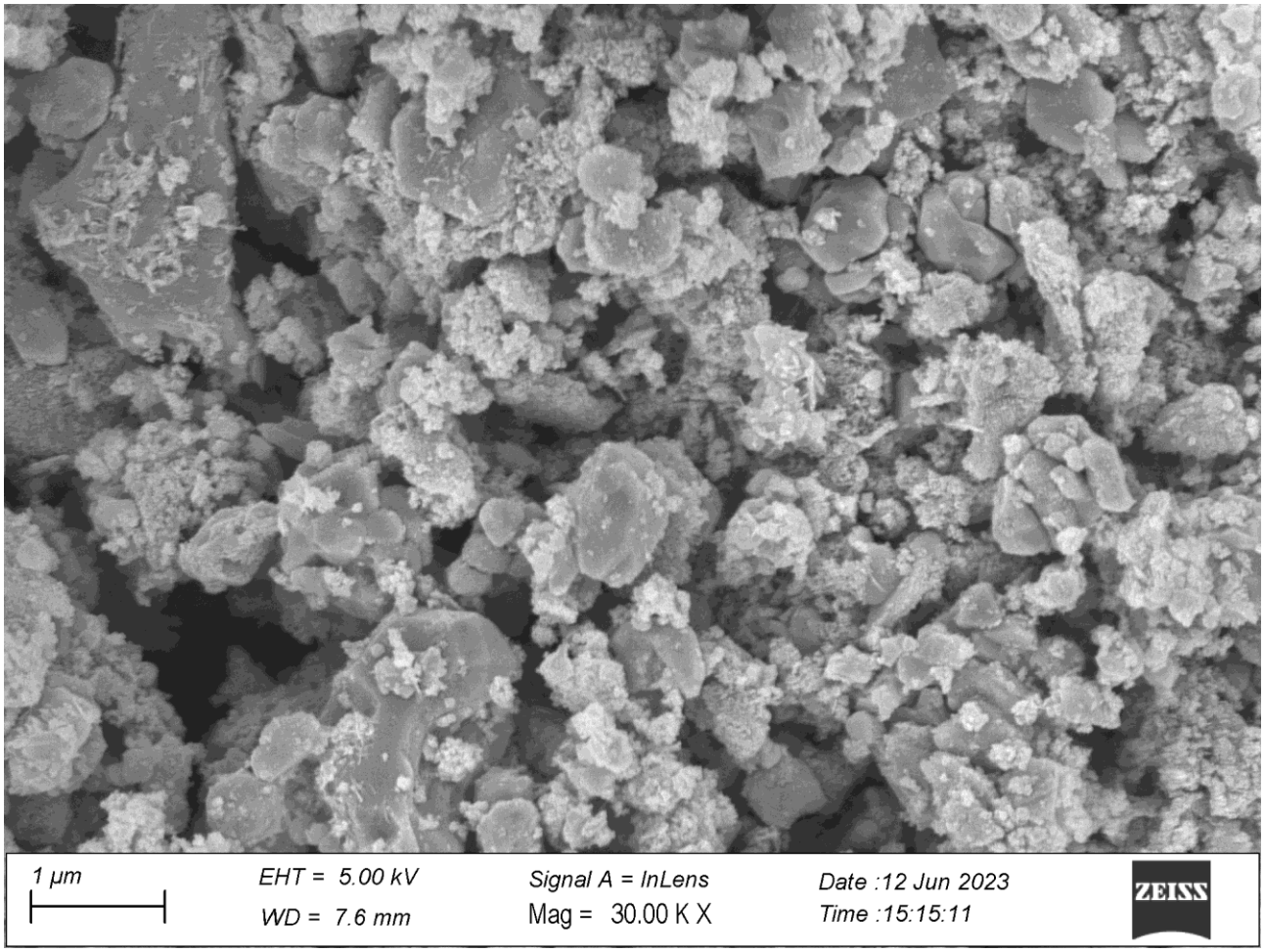

Fig. S11. SEM micrograph of S-11 sample (reaction medium: water/2-propanol/PEG400 12.5/37.5/50) at high magnifications.

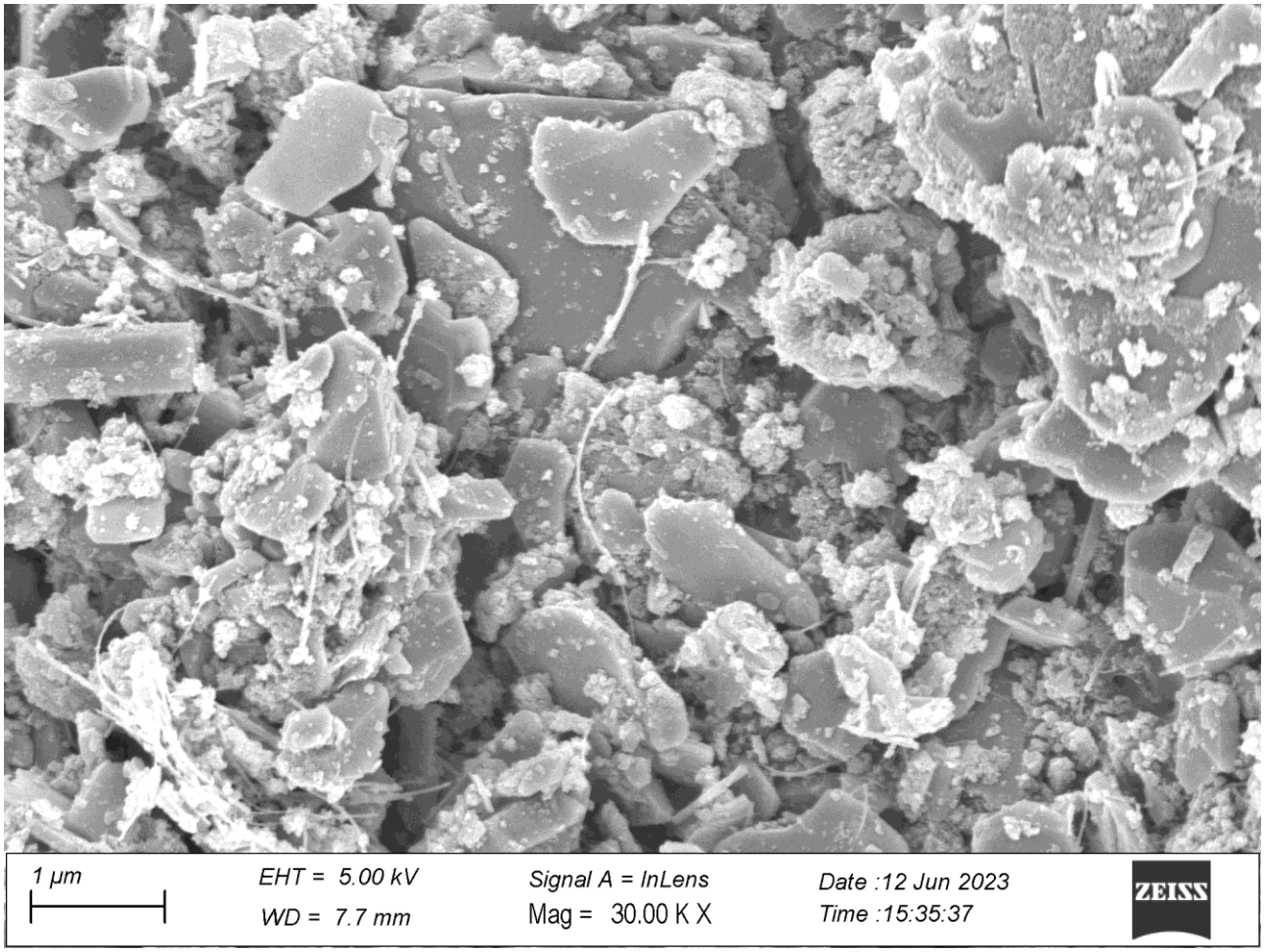

Fig. S12. SEM micrograph of S-12 sample (reaction medium: water/PEG400 50/50, with double amount of $Na_2S_2O_3 \cdot 5H_2O$, namely 4 mmol) at high magnifications.

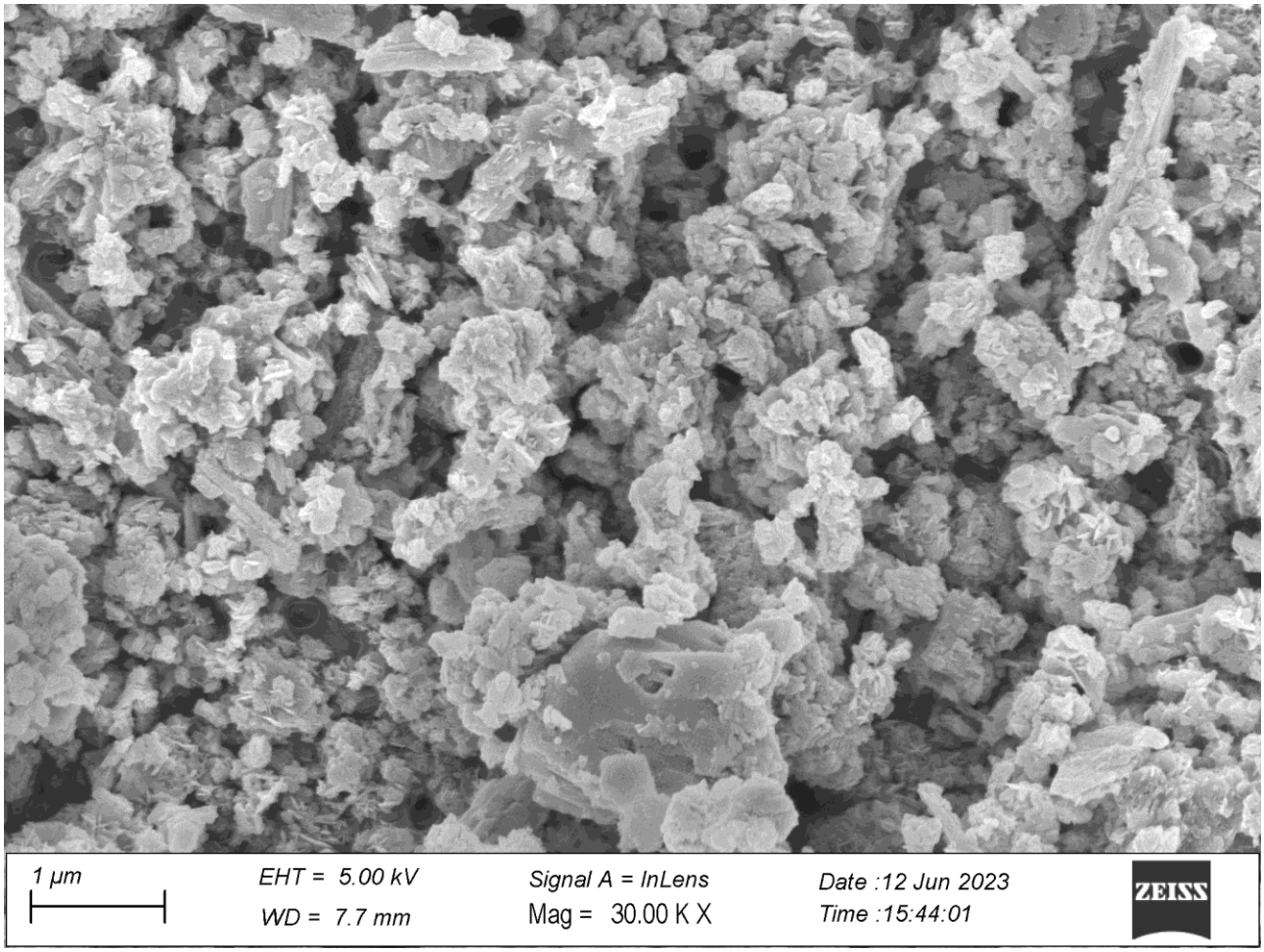

Fig. S13. SEM micrograph of S-13 sample (reaction medium: 2-propanol/PEG400 50/50, with double amount of $Na_2S_2O_3 \cdot 5H_2O$, namely 4 mmol) at high magnifications.

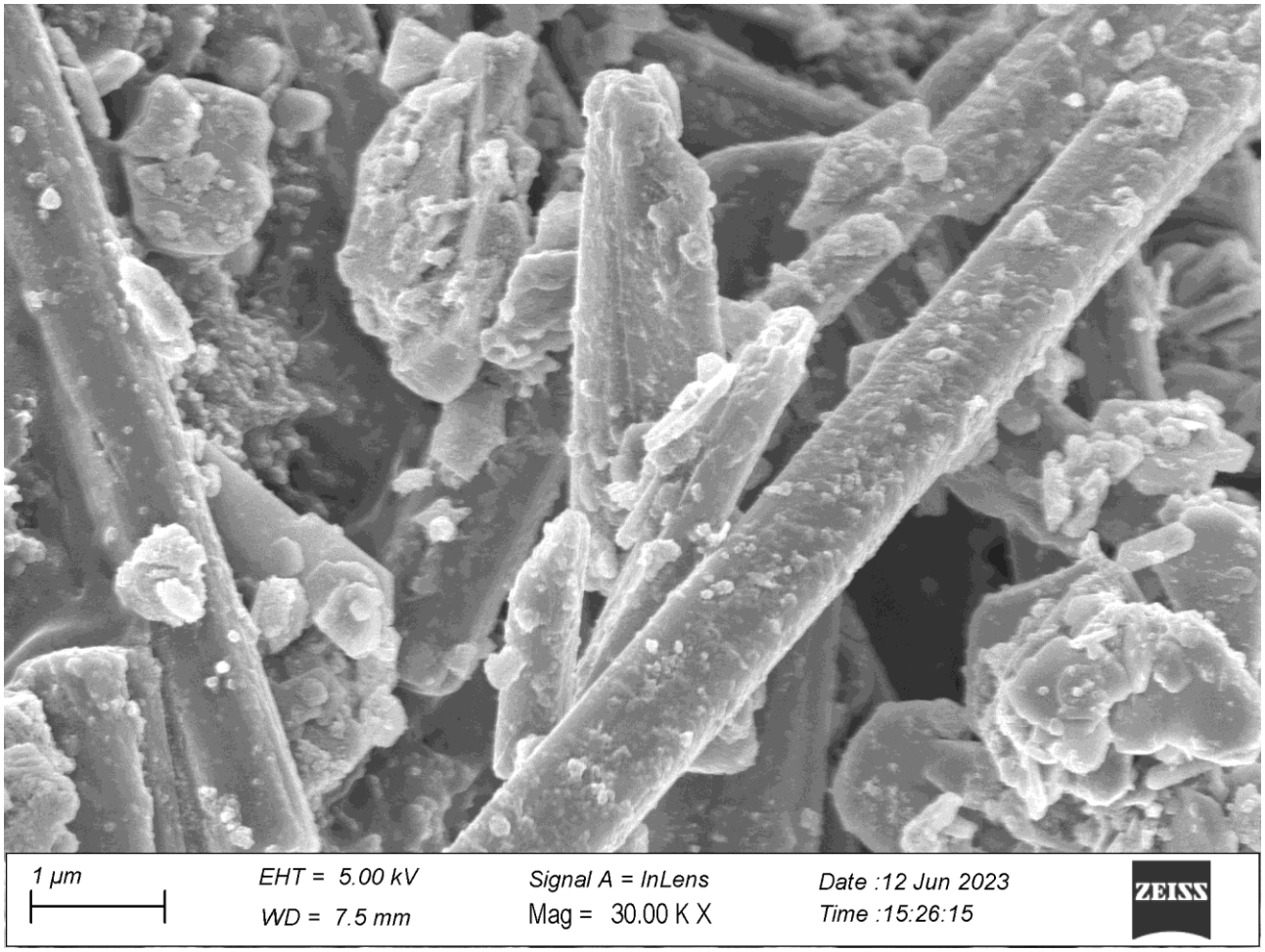

Fig. S14. SEM micrograph of S-14 sample (reaction medium: water/2-propanol/PEG400 25/25/50, with double amount of $Na_2S_2O_3 \cdot 5H_2O$, namely 4 mmol) at high magnifications.

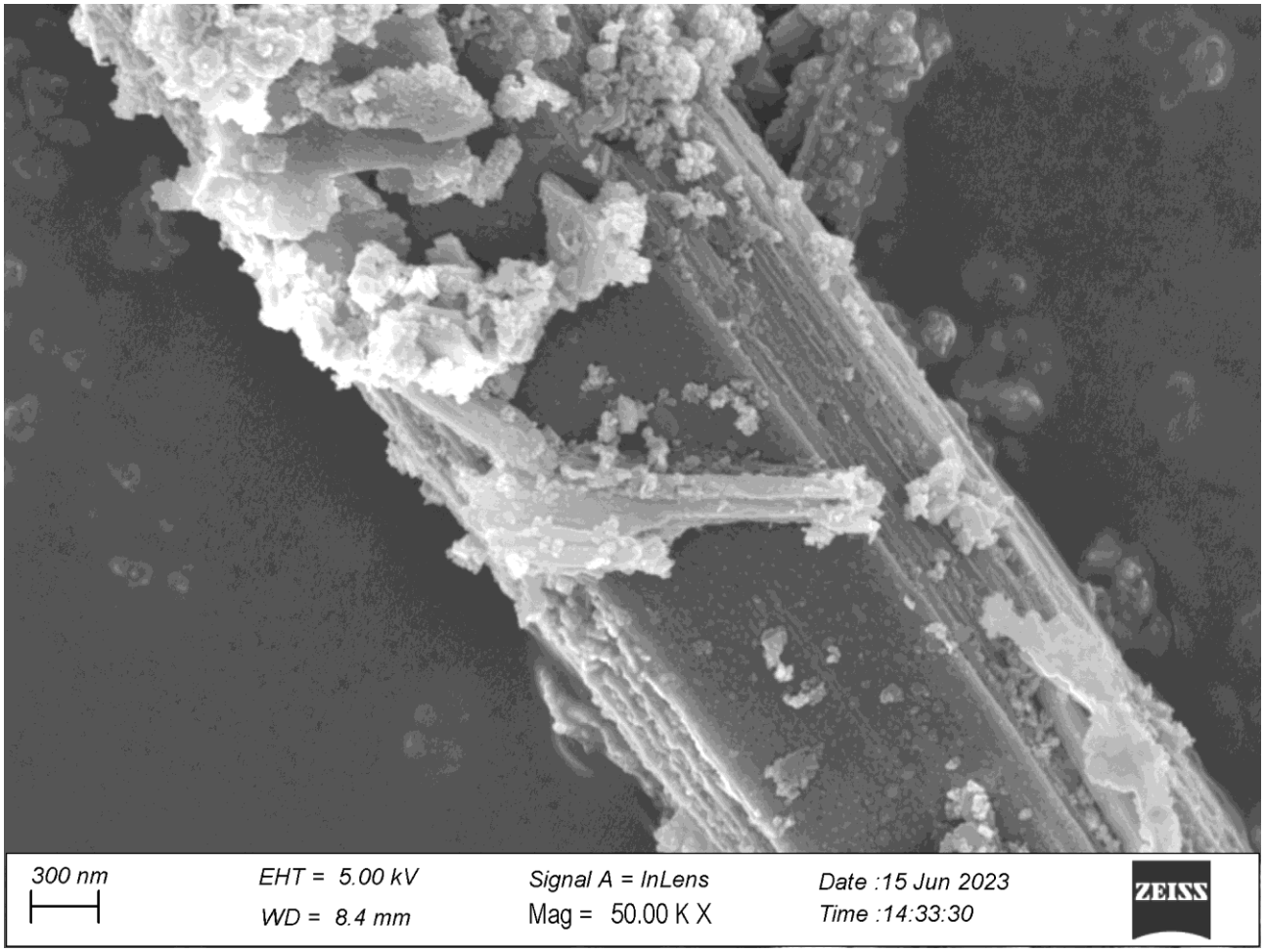

Fig. S15. SEM micrograph of S-15 sample (reaction medium: water/PEG400 50/50, with double amount of $FeSO_4 \cdot 7H_2O$ from, namely 8 mmol) at high magnifications.

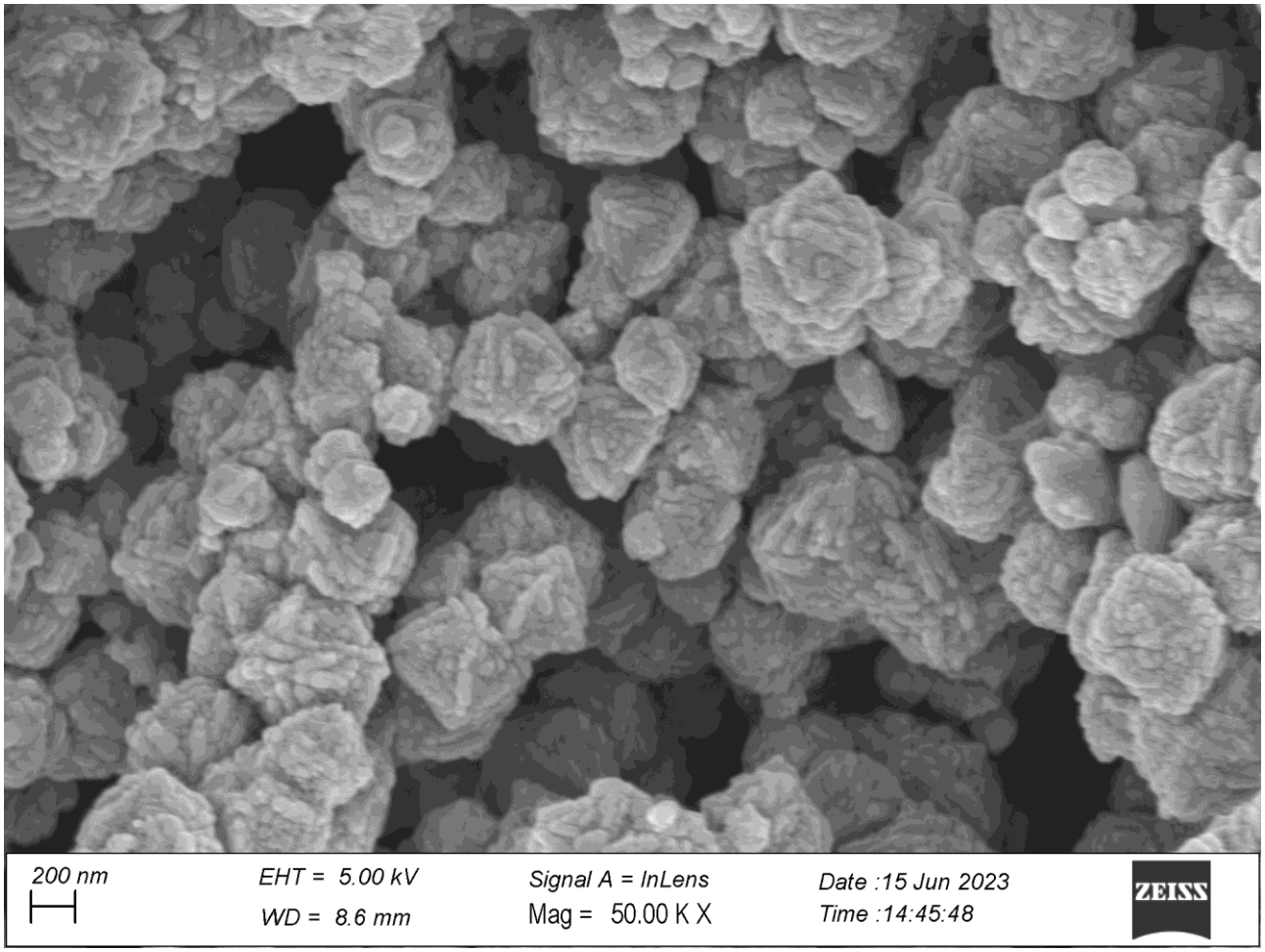

Fig. S16. SEM micrograph of S-16 sample (reaction medium: 2-propanol/PEG400 50/50, with double amount of $FeSO_4 \cdot 7H_2O$ from, namely 8 mmol) at high magnifications.

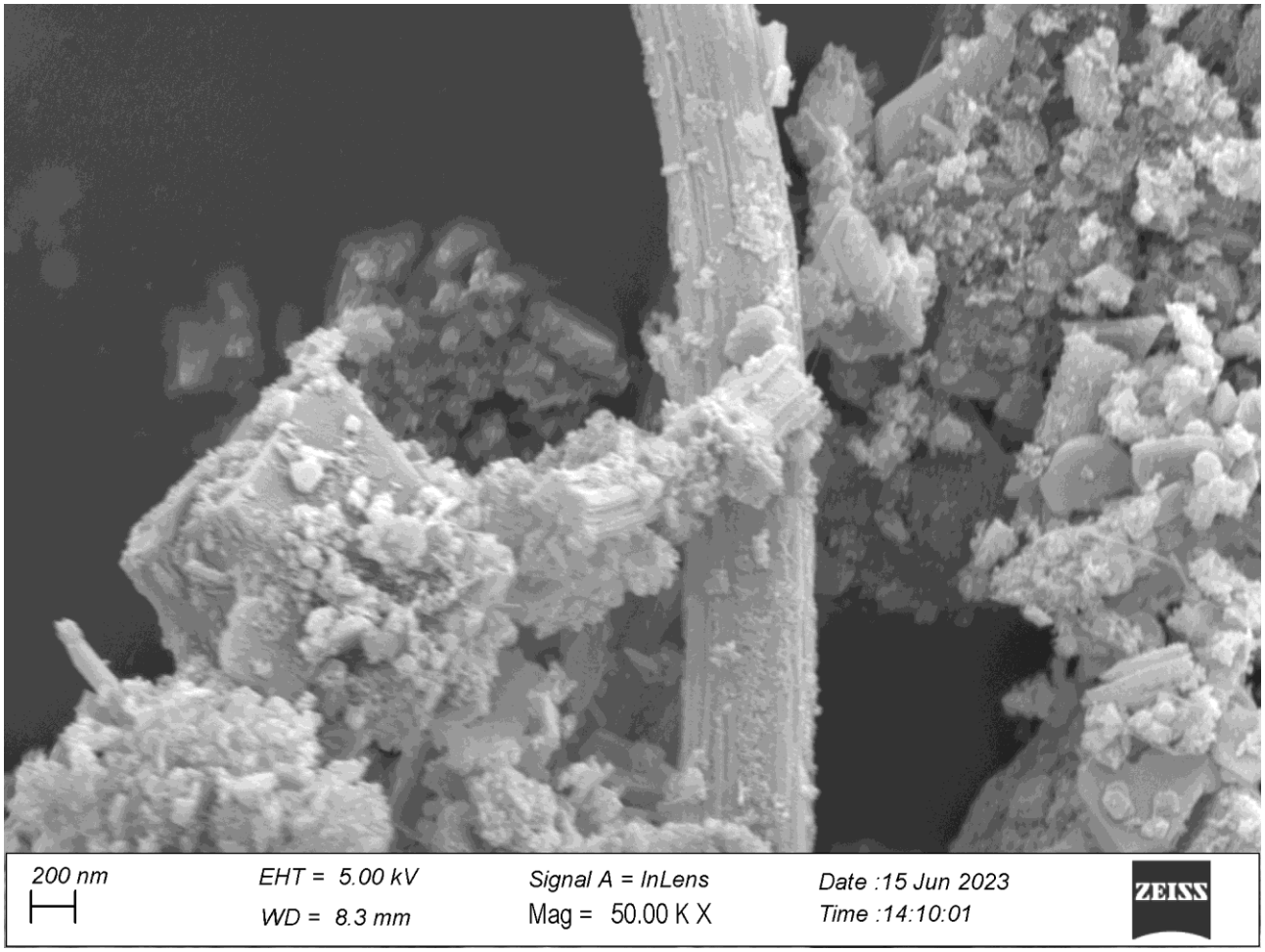

Fig. S17. SEM micrograph of S-17 sample (reaction medium: water/2-propanol/PEG400 25/25/50, with double amount of $FeSO_4 \cdot 7H_2O$ from, namely 8 mmol) at high magnifications.

S2. TEM-SAED Morphological characterizations

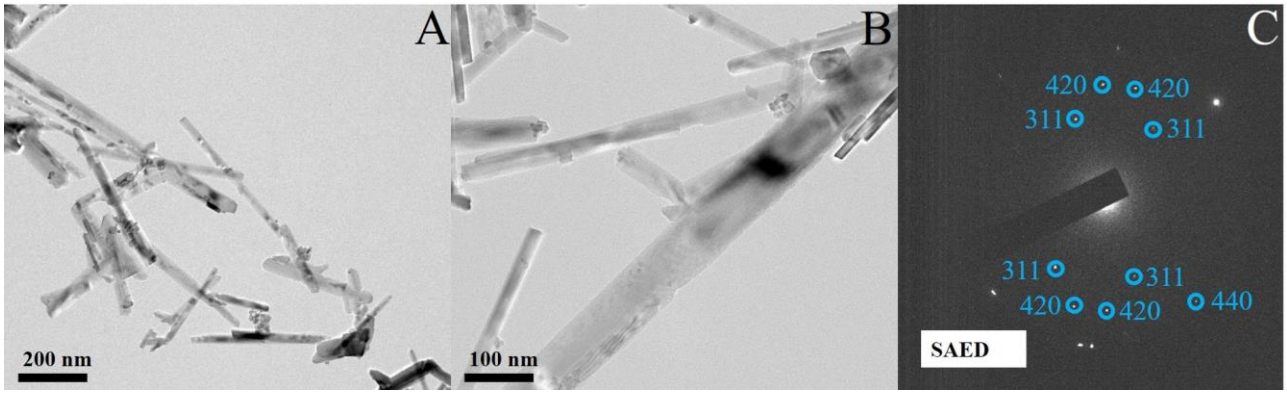

Fig. S18. TEM micrographs of S-02 sample (reaction medium: water/PEG400 75/25) at low (A), and high (B) magnifications, together with SAED pattern (C).

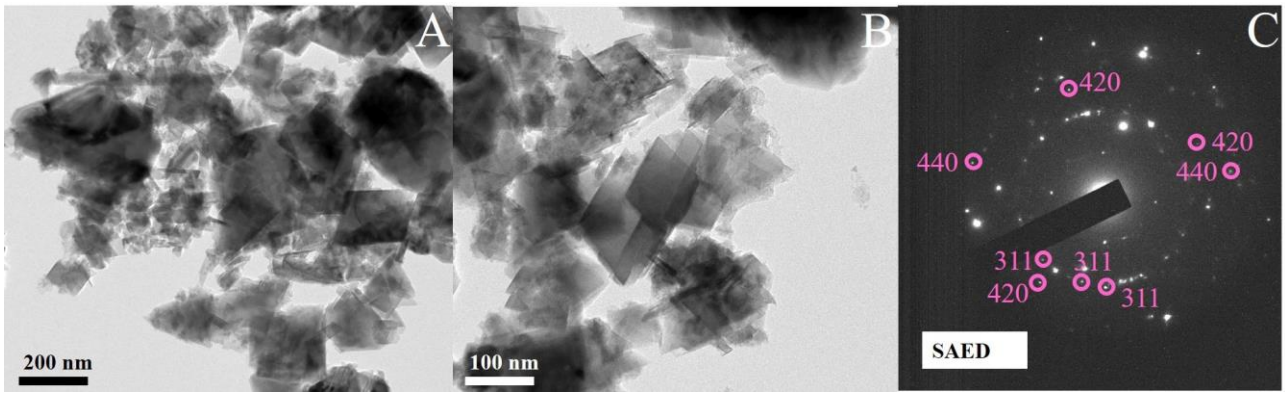

Fig. S19. TEM micrographs of S-06 sample (reaction medium: 2-propanol/PEG400 75/25) at low (A), and high (B) magnifications, together with SAED pattern (C).

In the case of sample S-02 (**Fig. S18**), TEM analysis confirmed the morphology detected with the SEM analysis, with rods nanoparticles with *ca*. 500 nm – 1 μm length, and *ca*. 50-100 nm thickness. The selected-area electron diffraction (SAED) pattern in **Fig. S18C** confirmed the crystalline nature of the nanorods being associated with the magnetite phase, with presence of the main relevant reflections at d_{hkl} *ca*. 2.5 Å (311), *ca*. 1.8 Å (420), and *ca*. 1.5 Å (440). In the case of sample S-06 (**Fig. S19**), TEM analysis revealed the presence of polyhedral plate nanoparticles, whose size can be estimated being *ca.* 200 nm. The SAED pattern in **Fig. S19C** confirmed the crystalline nature of the sample with formation of diffraction spots. Even in this case, the SAED analysis confirmed the presence of the magnetite phase, with main relevant reflections at d_{hkl} *ca*. 2.5 Å (311), *ca*. 1.8 Å (420), and *ca*. 1.5 Å (440).