Supplementary Materials

Enhanced Tribological Performance of Low-Friction Nanocomposite WSe$_x$S$_y$/NP-W Coatings Prepared by Reactive PLD

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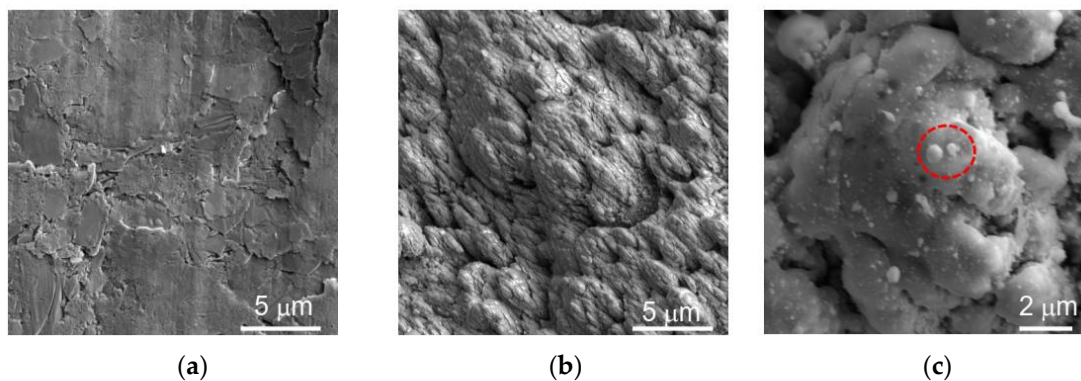
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(**a**)　　　　　　　　(**b**)　　　　　　　　(**c**)

Figure S1. SEM images of (**a**) as prepared and (**b**,**c**) laser ablated WSe$_2$ target with two magnifications; the area for EDS analysis is indicated in a red circle in (**c**).
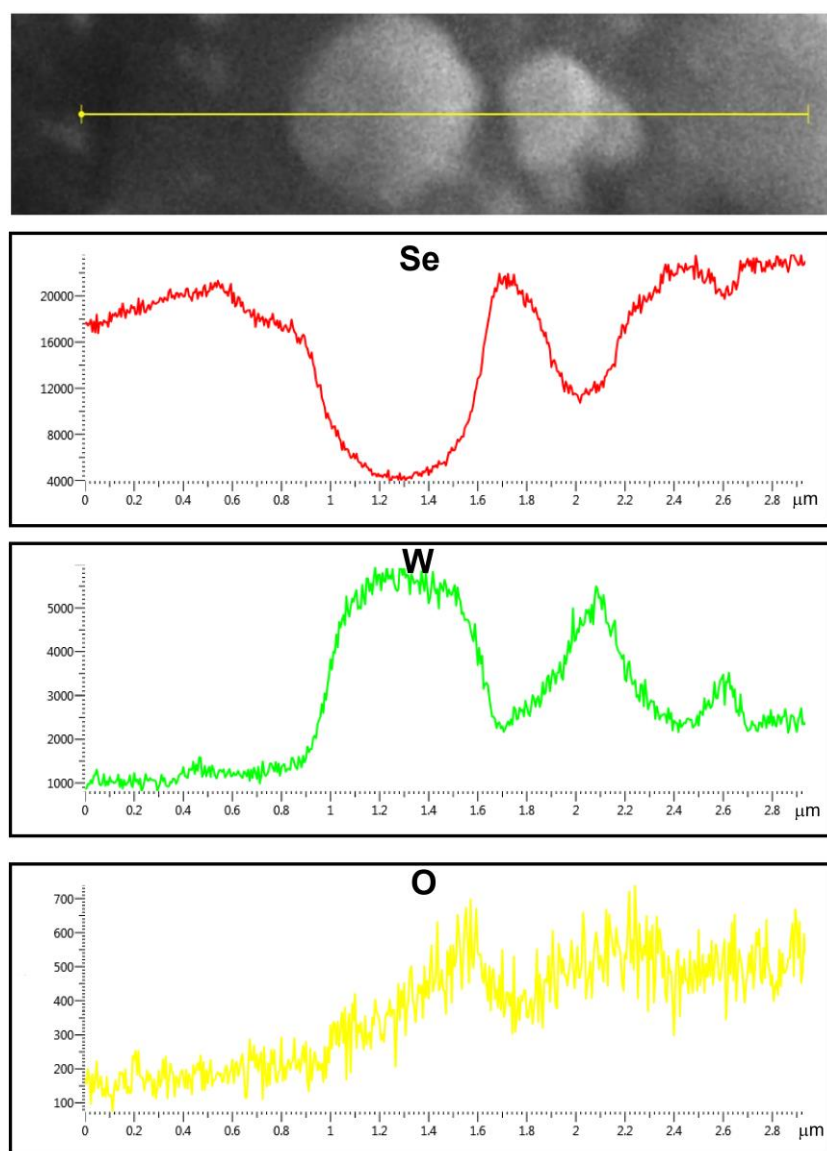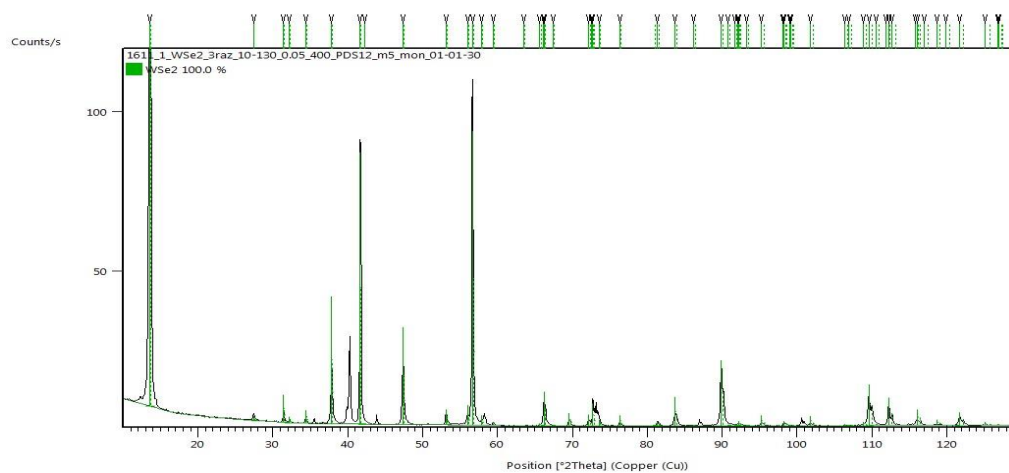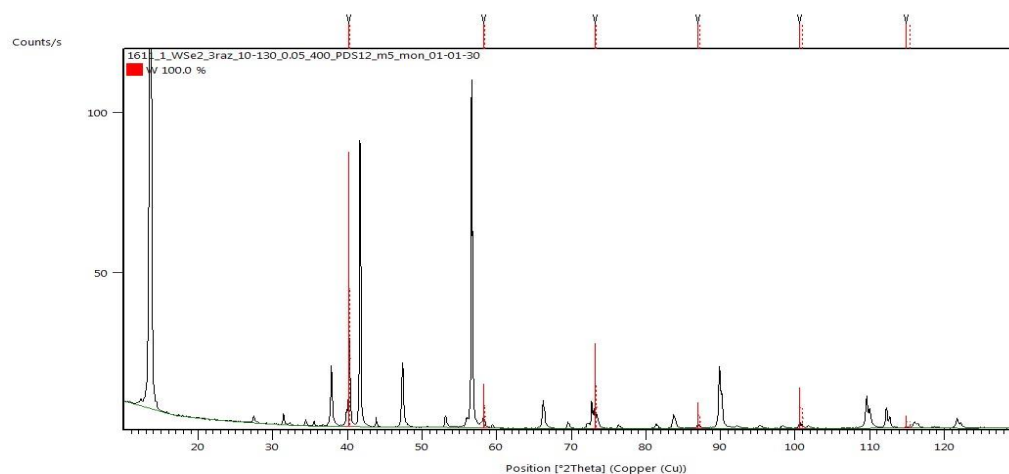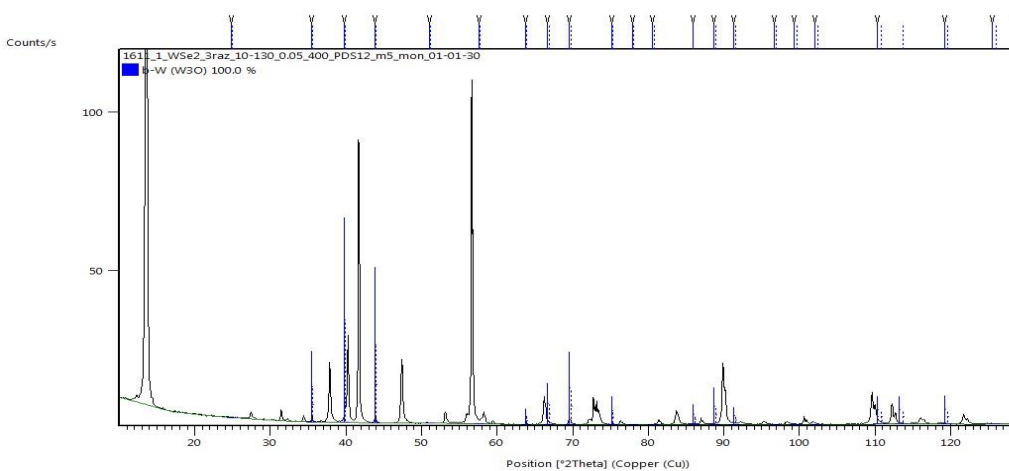
Figure S2. Distribution of elements in a local area of the WSe_2 target subjected to laser ablation. The area is indicated in Figure S1c, and it contains spherical particles which were formed after laser ablation.

(**a**)

(**b**)

(**c**)

Figure S3. XRD pattern of laser ablated WSe₂ target exhibits the content of (**a**) WSe2 (P63/mmc), (**b**) α-W (Im3m), and (**c**) W3O/β-W (Pm3n) phases.

The diffraction patterns were measured on a PANalytical Empyrean Series 2 X-ray diffractometer using monochromatized CuKα radiation. The phase composition was analyzed using the PANalytical High Score Plus software and the ICCD PDF-2 database.
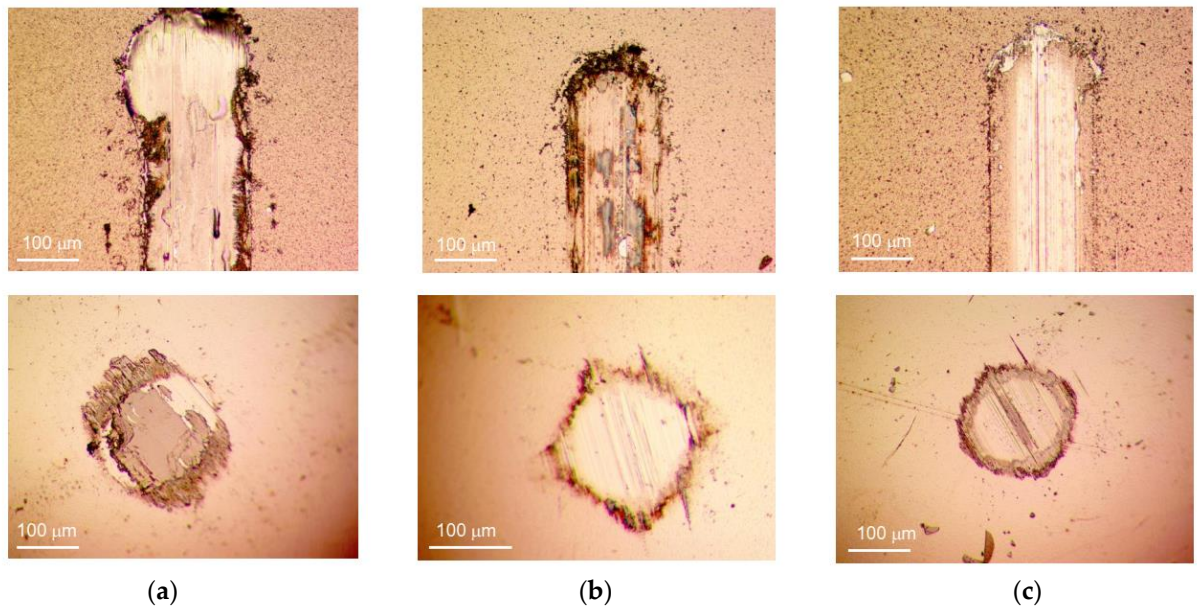
(**a**) (**b**) (**c**)

Figure S4. Optical images of the wear tracks and wear scars for (**a**) WSe$_x$/NP-W, (**b**) WSe$_x$S$_y$/NP-W_3.6, and (**c**) WSe$_x$S$_y$/NP-W_9 coatings after tribotesting in N$_2$-enriched environment at a load of 5 N at −100°C. The test duration for each coating is indicated in Figure 7.