

Supplementary Information

Carbon uptake during Spark Plasma Sintering: investigation through the analysis of the carbide “footprint” in a Ni-W alloy

B. B. Bokhonov,^{a, b} A. V. Ukhina,^a D. V. Dudina,^{a, b, c} A. G. Anisimov,^c

V. I. Mali^c and I. S. Batraev^c

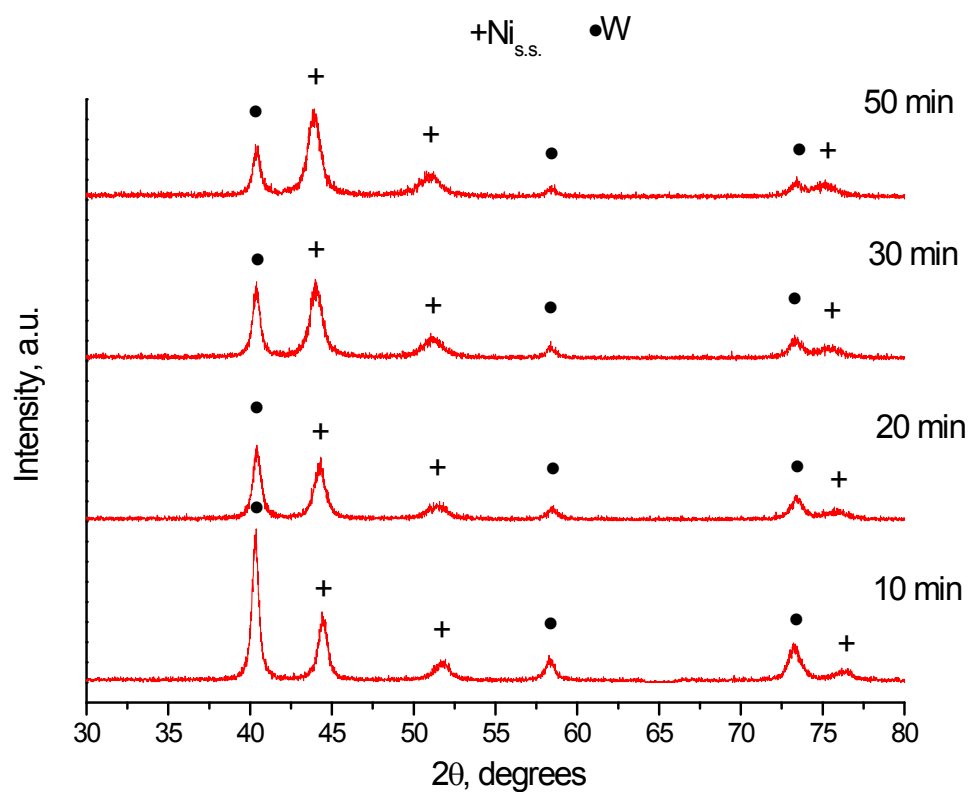
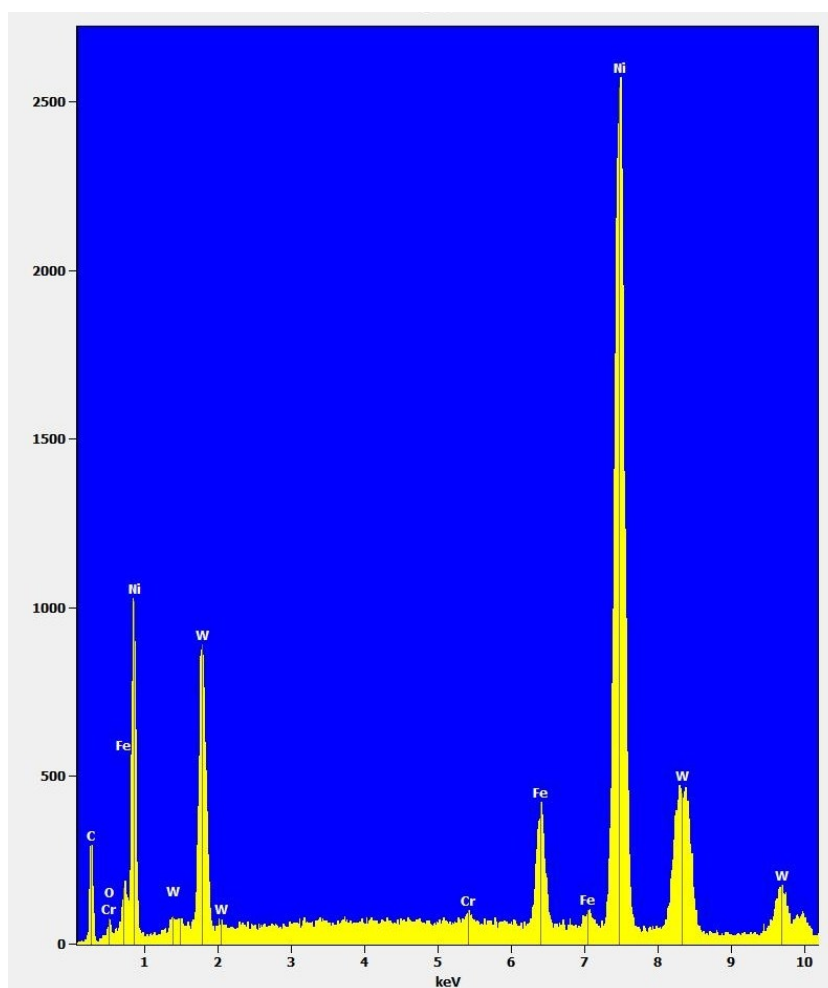


Figure 1S. The evolution of the XRD patterns of the mechanically milled Ni-15at.%W powder mixture with milling time ($\text{Ni}_{\text{s.s.}}$ = Ni-based f.c.c. solid solution).



Line	at. %	Error
C K	38.08	± 1.00
O K	5.92	± 0.61
Cr K	0.40	± 0.05
Fe K	4.13	± 0.16
Ni K	43.79	± 0.37
W L	7.68	± 0.28

Figure 2S. EDS taken from an area in the cross-section covering the graphite foil and a WC-containing layer at one of the flat ends of the pellet. Along with W, Ni and C, Cr and Fe are present due to contamination introduced during prolonged mechanical milling.

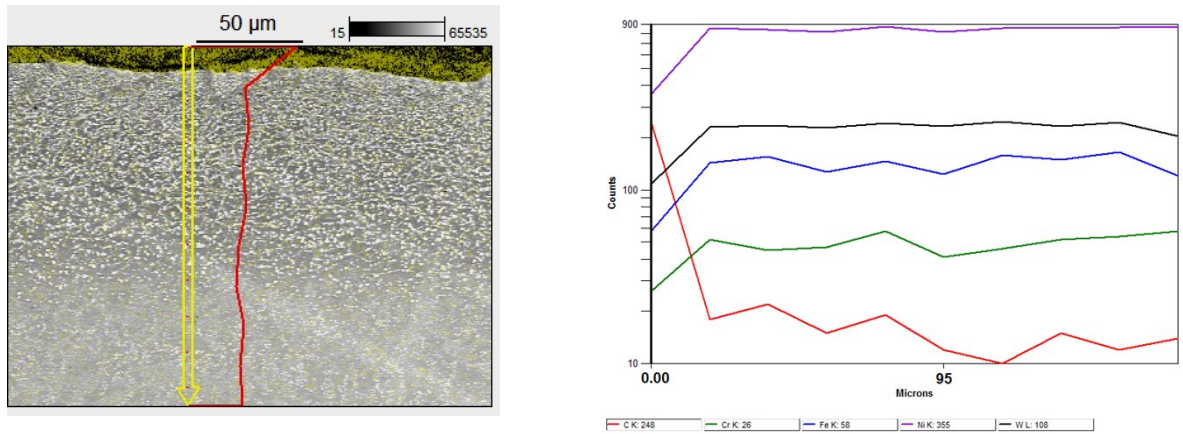


Figure 3S. Concentration profiles of C, Ni, W, Fe and Cr (the measurements start at the graphite foil and proceed through and beyond the WC-containing subsurface layer).

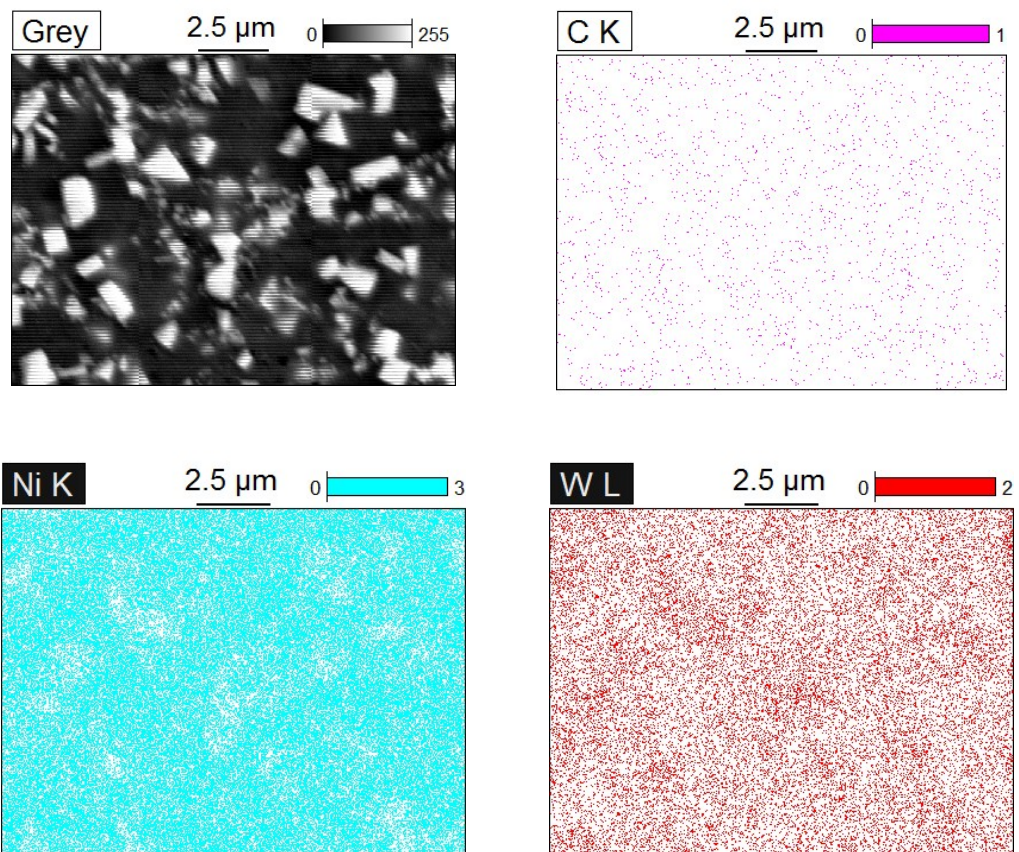


Figure 4S. Elemental mapping of an area of the WC-containing layer of the compact Spark Plasma Sintered from the Ni-15at.%W powder.

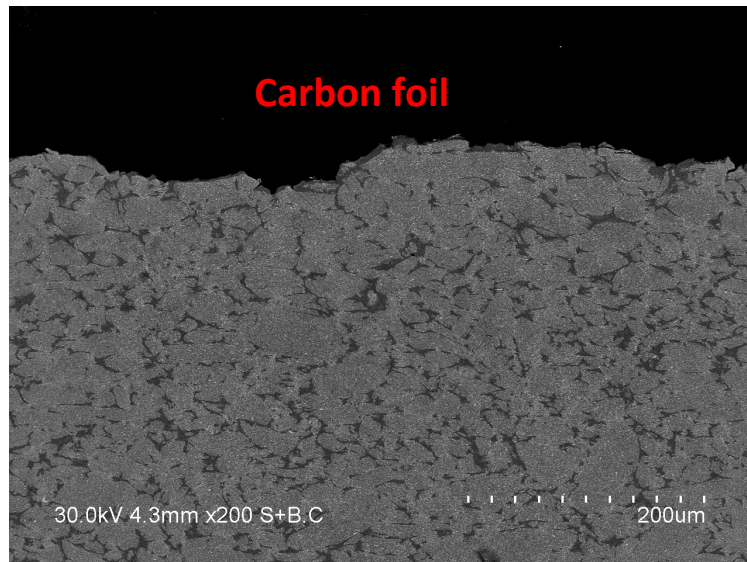
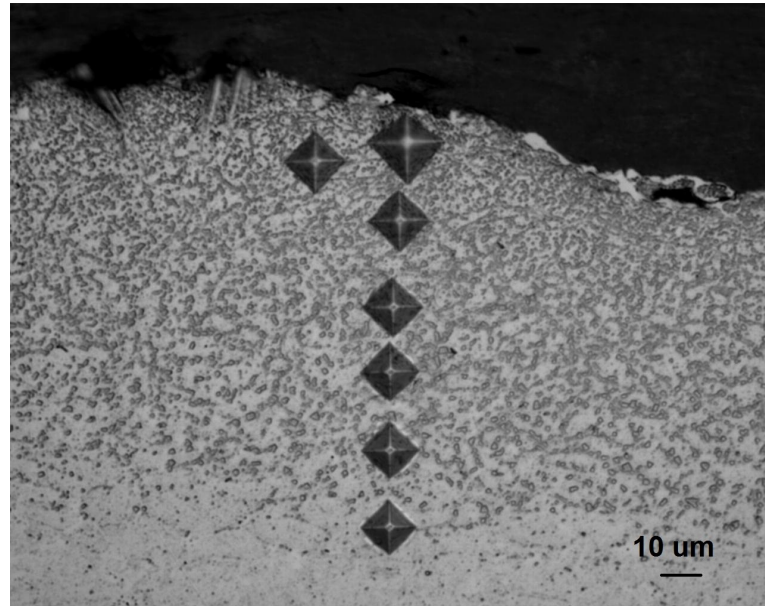
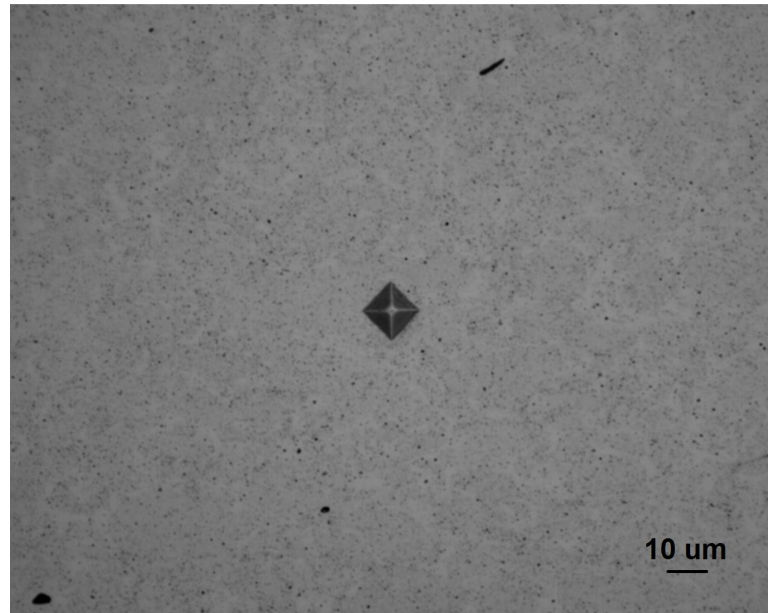


Figure 5S. Cross-sectional view of the pellet Spark Plasma Sintered from the Cu-15at.%W powder in contact with the graphite foil at 900 °C.



a



b

Figure 6S. Optical images of the indents obtained during Vickers hardness measurements: (a) WC-containing layer, (b) interior of the sintered pellet. The indents in (a) are deliberately placed along a vertical line perpendicular to the interface between the flat end of the sintered pellet and the graphite foil to show that their size decreases with distance from the interface.