## **Supplementary Information**

**Figure S3:** Flat crater profile for tantalum with small grains at discharge condition of 2.3 mA, 0.7 kV using 0.25 ml/min argon flow after sputtering for 1.5 h, zoomed with a different axis scale using Figure 1B......2



**Figure S1:** Relationship between sputtering rate in terms of weight loss and voltage for tantalum with small grains.



**Figure S2:** EBSD map overlaid over secondary electron micrograph for tantalum sample with large grains showing grain boundaries and differential sputtering after 2.5 h sputtering at discharge condition of 5 mA, 1 kV. Corresponding inverse pole figure legend to the right.



**Figure S3:** Flat crater profile for tantalum with small grains at discharge condition of 2.3 mA, 0.7 kV using 0.25 ml/min argon flow after sputtering for 1.5 h, zoomed with a different axis scale using Figure 1B.