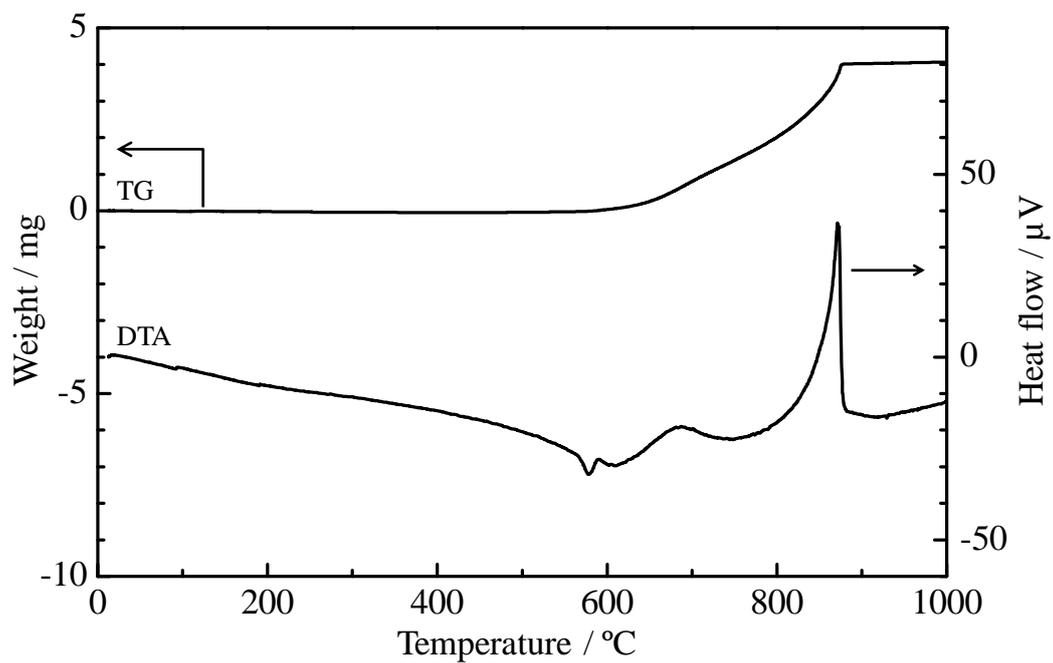
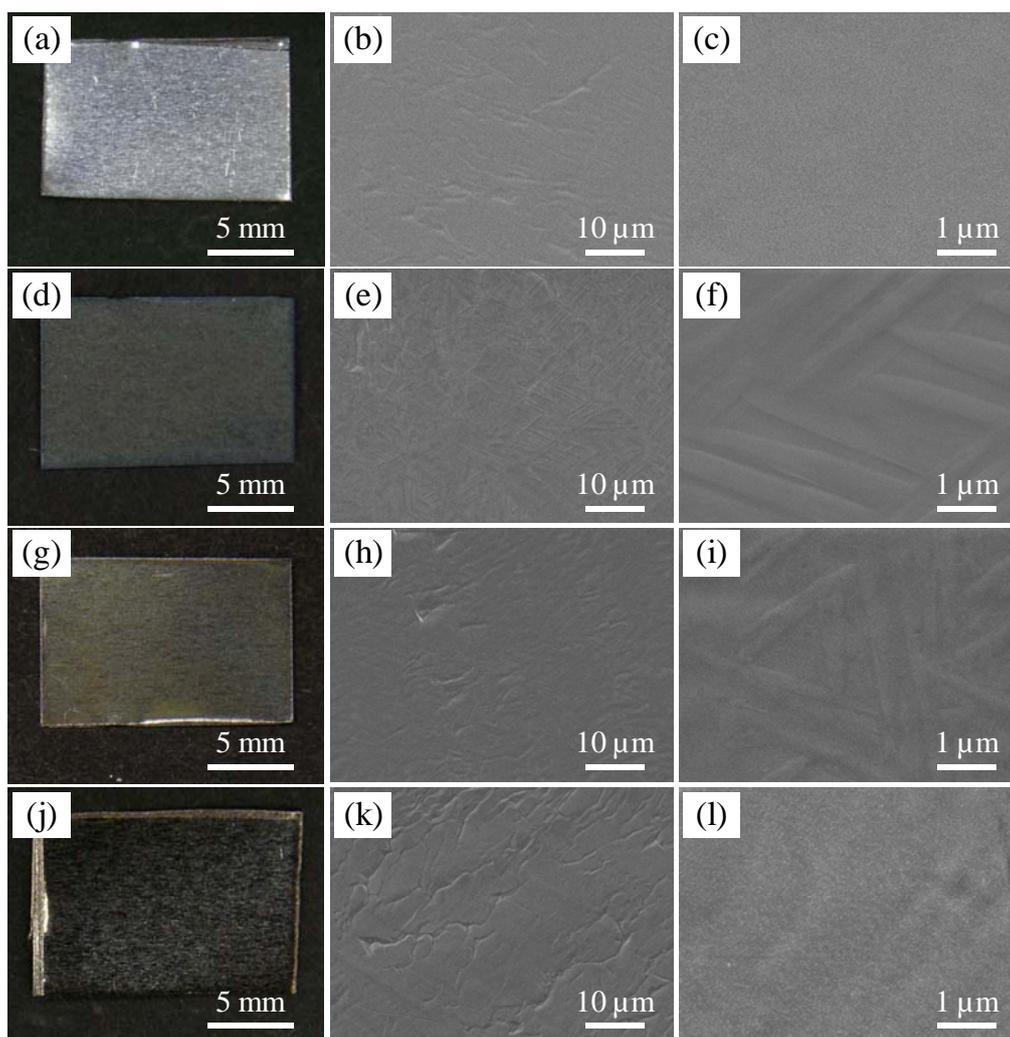


ESI 1 Temperature profile for the fabrication of NaTaO<sub>3</sub> crystal layer. The uncontrolled cooling process was plotted using actual measurement values.



ESI 2 TG-DTA curves of Ta substrate. 18 mg of Ta was heated from room temperature to 1000 °C at the rate of 10 °C·min<sup>-1</sup> to form Ta<sub>2</sub>O<sub>5</sub>. The increased weight indicated by the TG curve perfectly agreed with the transformation of Ta to Ta<sub>2</sub>O<sub>5</sub>.



ESI 3 Digital photographs and SEM images of the surfaces of various layers: (a–c) untreated Ta substrate, (d–f) Ta<sub>4</sub>O layer, (g–i) nitrided Ta<sub>4</sub>O layer, and (j–l) nitrided Ta layer. The Ta<sub>4</sub>O layer was fabricated by heating the Ta substrate at 500 °C for 10 min in air; the nitrided Ta<sub>4</sub>O layer was fabricated by heating the Ta<sub>4</sub>O layer at 850 °C for 15 min under NH<sub>3</sub> flow; the nitrided Ta layer was fabricated by heating the raw Ta substrate at 850 °C for 15 min under NH<sub>3</sub> flow.