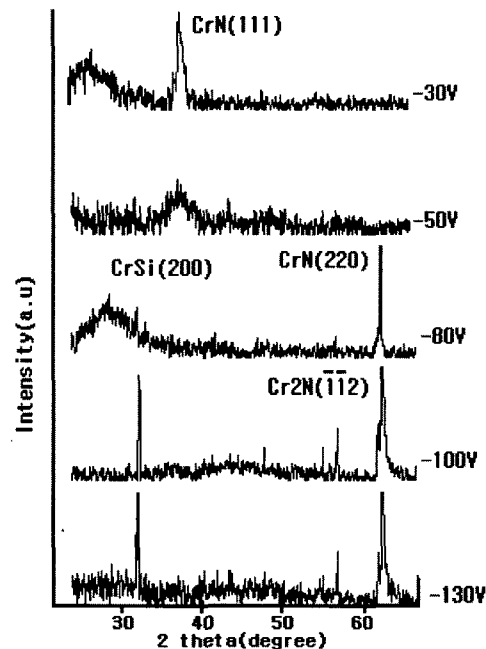
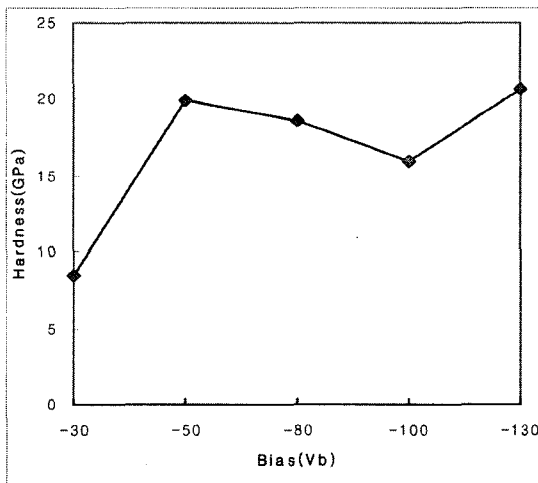


## Chromium nitride coating by inductively coupled plasma-assisted RF magnetron sputtering

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Chromium Nitride (CrN) films were prepared by using inductive coupled plasma-assisted RF magnetron sputtering (ICPAMS) to investigate the effect of substrate bias voltage on the hardness, surface morphology, root mean square (RMS) roughness, and crystallinity on Si(100) substrate<sup>(1)</sup>. As increasing a bias voltage ( $V_b$ ) from -30 to -130 volt. The surface nano hardness also increased from 7 ( $V_b=-30$ ) to 21 GPa ( $V_b=-130$ ). In SEM image, it can be concluded that the grain size also effected by the  $V_b$  condition. The grain size increased proportionally as increasing  $V_b$  from -30 to -80, while beyond -80V<sub>b</sub>, the grain size was deteriorated by an intense nitrogen ion ( $N^+$ ) beam bombardment which led a lot's of nucleation seed on growing CrN films<sup>(2)</sup>. The lowest surface roughness of 0.15nm was obtained at  $V_b$  of 130 in this study. XRD analysis showed that the CrN (220) orientation growth occurred at  $V_b$  of -80.



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