Supplementary Material

Low-Friction and Corrosion-Resistant Orthodontic Stainless Steel Archwires with Functional Carbon Films

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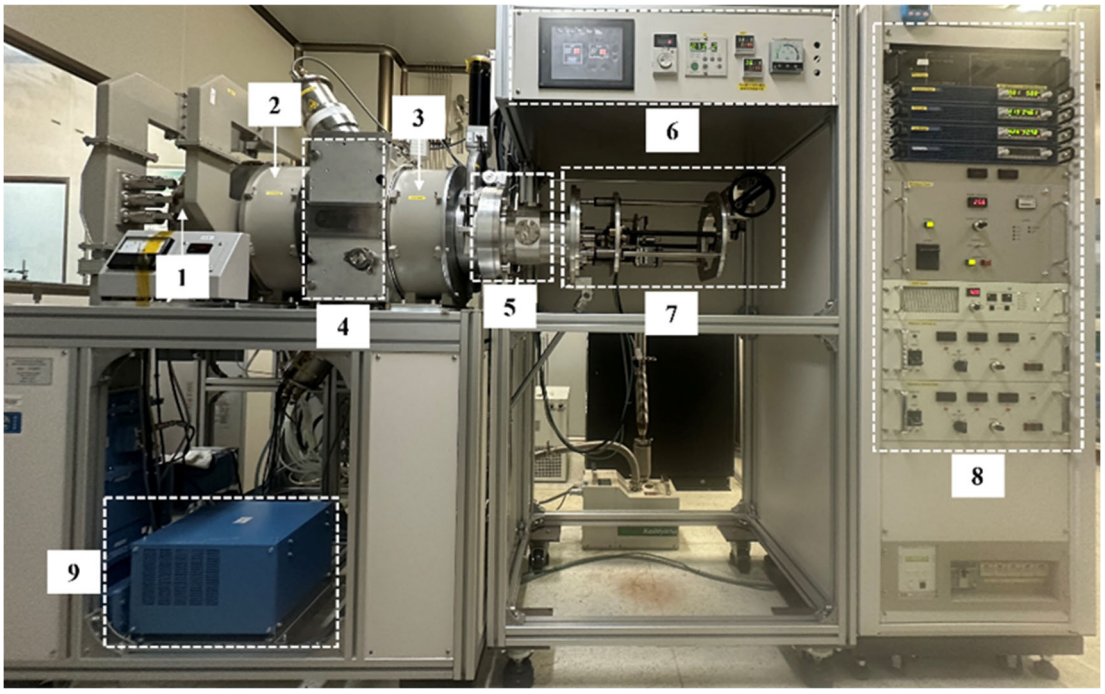


Figure S1. Photograph of the customized electron cyclotron resonance plasma sputtering apparatus. Specifically, 1 is left coil, 2 is middle coil, 3 is right coil, 4 is main vacuum chamber, 5 is pre-vacuum chamber, 6 is program control panel, 7 is substrate holder, 8 is voltage and current control panel, and 9 is the microwave generator.

Table S1. Experimental conditions of the carbon films deposition.

Deposition parameters	Values
Gas pressure (Pa)	0.1
Microwave power (W)	256
Target bias voltage (V)	−500
Coil current (A)	Left: 40 / Middle: 40 / Right: 48
Substrate bias voltage (V)	+5 / +10 / +20 / +50
Deposition time (min)	25 / 35 / 50 / 80

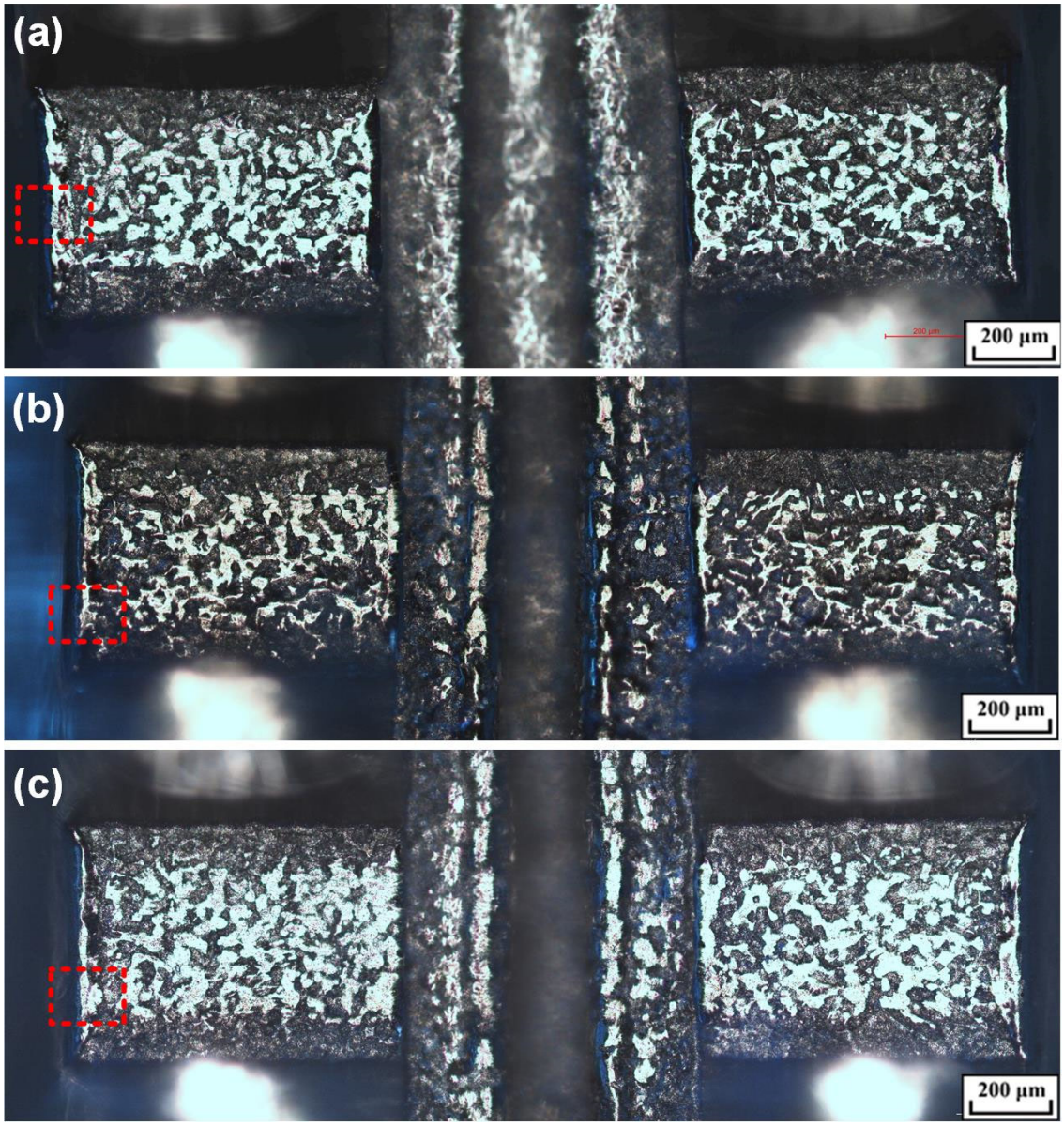


Figure S2. Optical images of the wear tracks on the stainless steel brackets after sliding against different archwires in an artificial saliva environment. (a) Uncoated/unsoaked archwire. (b) Coated/unsoaked archwire. (c) Coated/soaked archwire. The wear tracks, which are primarily located at the edges of the slot surfaces, are indicated by red dotted rectangles.

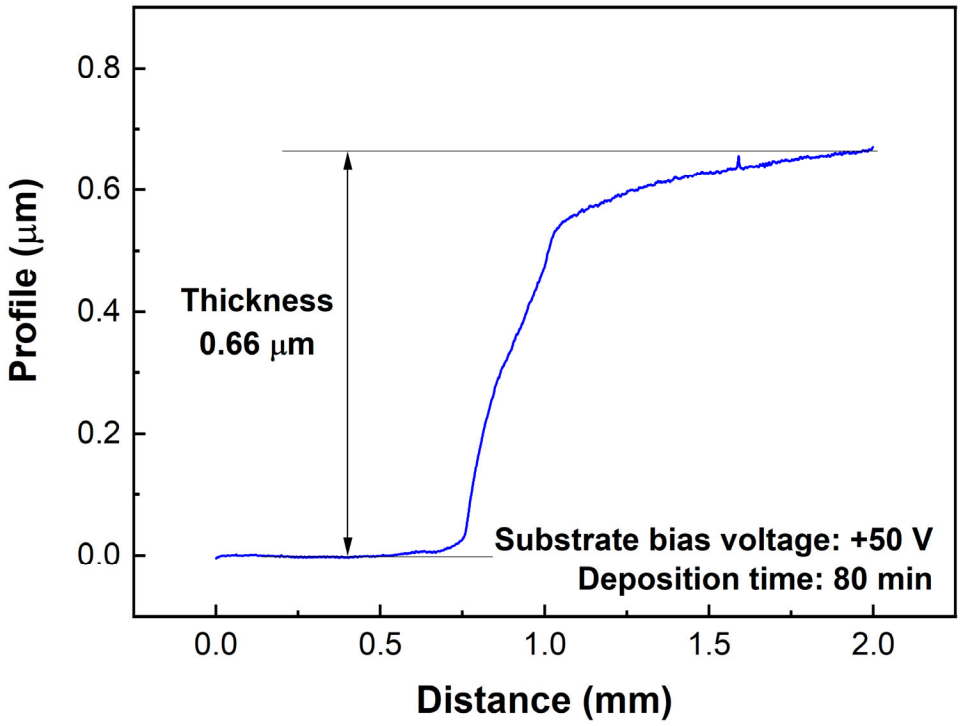


Figure S3. Cross-sectional profile of the GSEC film fabricated under a substrate bias voltage of +50 V and a deposition time of 80 min. The calculated film thickness was determined to be 0.66 μm.