

# Nucleation and growth of a nanobubble on rough surfaces: Supporting Information

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## Contact angle variation

In this section, we demonstrated that contact angle remains constant throughout the growth period as shown in Figures 1 and 2. Data have been shown for various rough surfaces at  $Da = 10000$  and  $5000$ . Huge variation in contact angle just after nucleation shows the noise in the data as it was difficult to resolve the interface for very small nanobubble. Constant contact angle means that the radius of the base circle is directly proportional to the radius of the bubble,  $R_b \propto R$ . In the inset of Figure 3 of main text, we used  $R_b$  instead of  $R$  to prevent displaying lot of noise in the data. Constant contact angle with time validate our claim that  $R_b$  can also be used instead of  $R$ .

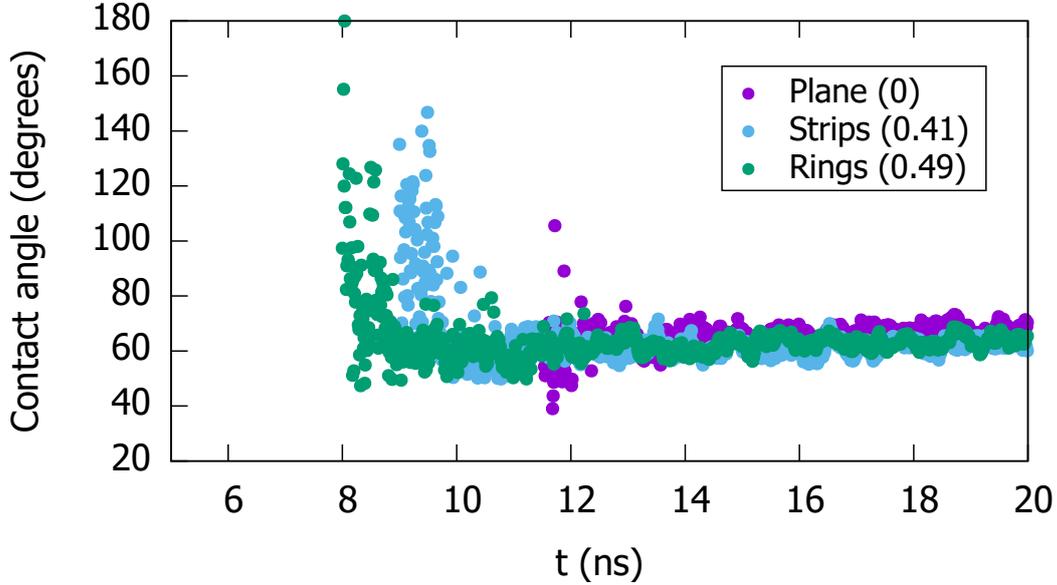


Figure 1: Contact angle of a nanobubble as a function of time for  $Da = 10000$  on various rough surfaces. Noise in initial data points shows the difficulty in resolving the interface of very small nanobubble.

## Variation of radius of nanobubble with time

In the main text, we concluded that during early growth radius of the bubble followed  $R \sim t^{1/3}$  behaviour and long term growth followed  $R \sim t^{1/2}$  behaviour. In this section we are explicitly showing plots of  $R^2$  and  $R^3$  to validate our claims (see Figures 3 and 4).

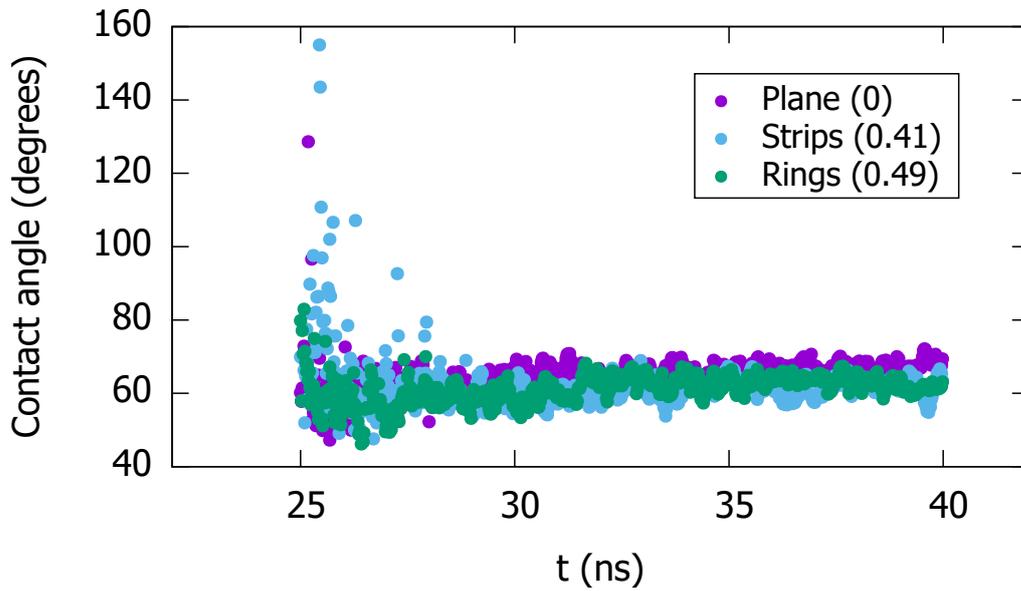


Figure 2: Contact angle of a nanobubble as a function of time for  $Da = 5000$  on various rough surfaces. Noise in initial data points shows the difficulty in resolving the interface of very small nanobubble.

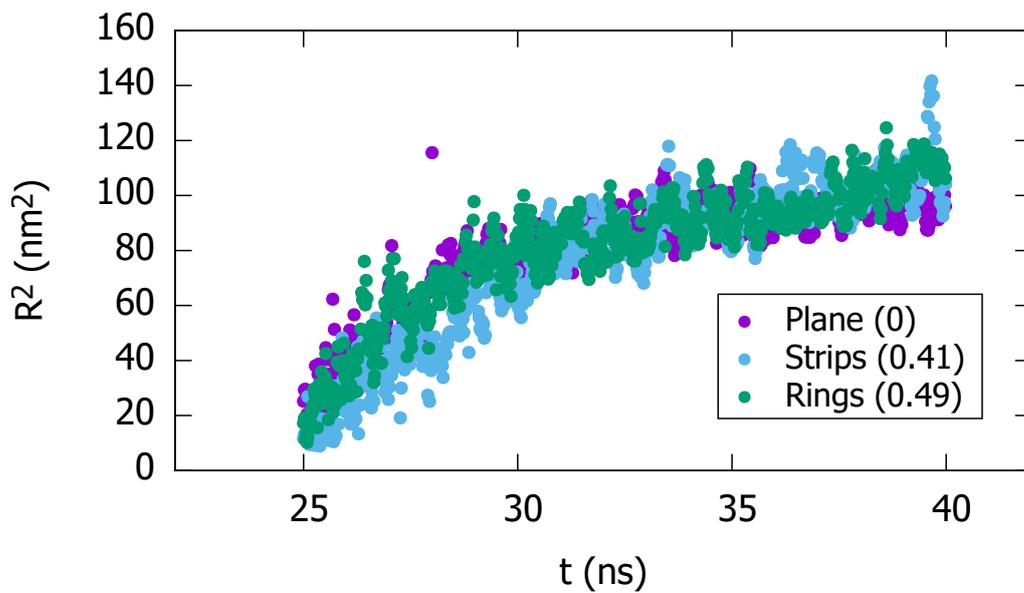


Figure 3: Square of radius of a nanobubble as a function of time for  $Da = 5000$  on various rough surfaces.

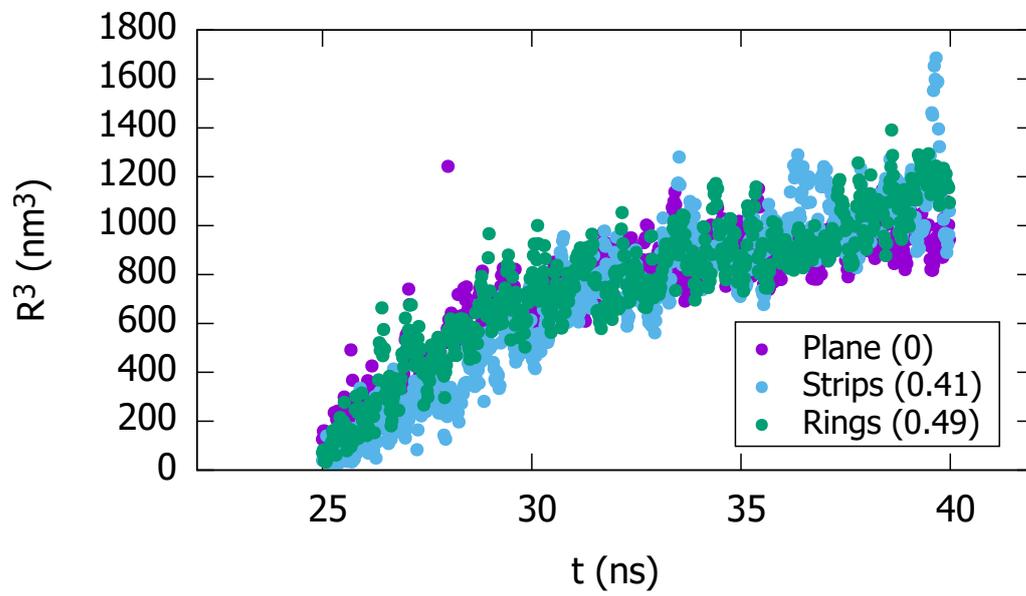


Figure 4: Cube of radius of a nanobubble as a function of time for  $Da = 5000$  on various rough surfaces.