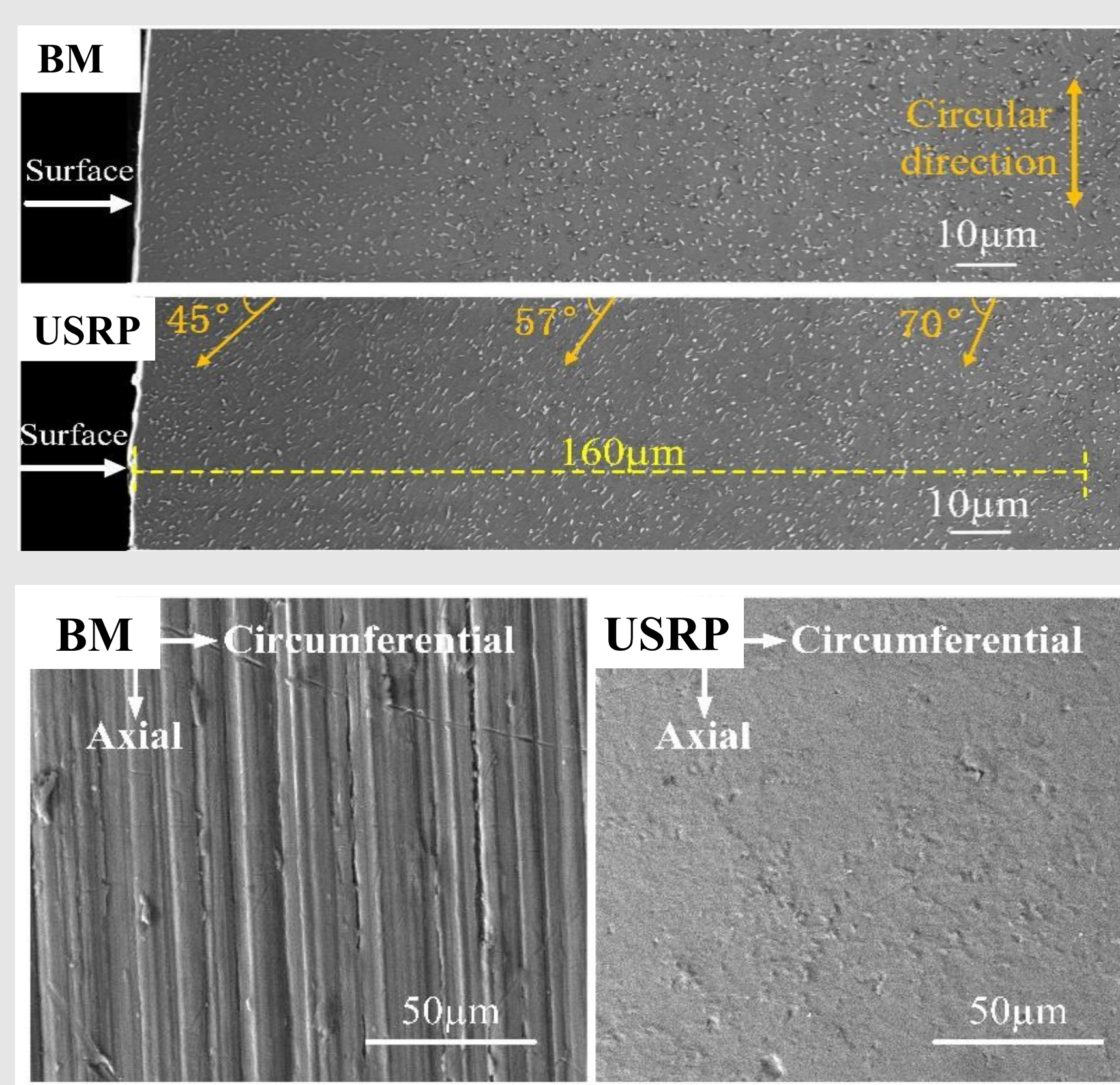
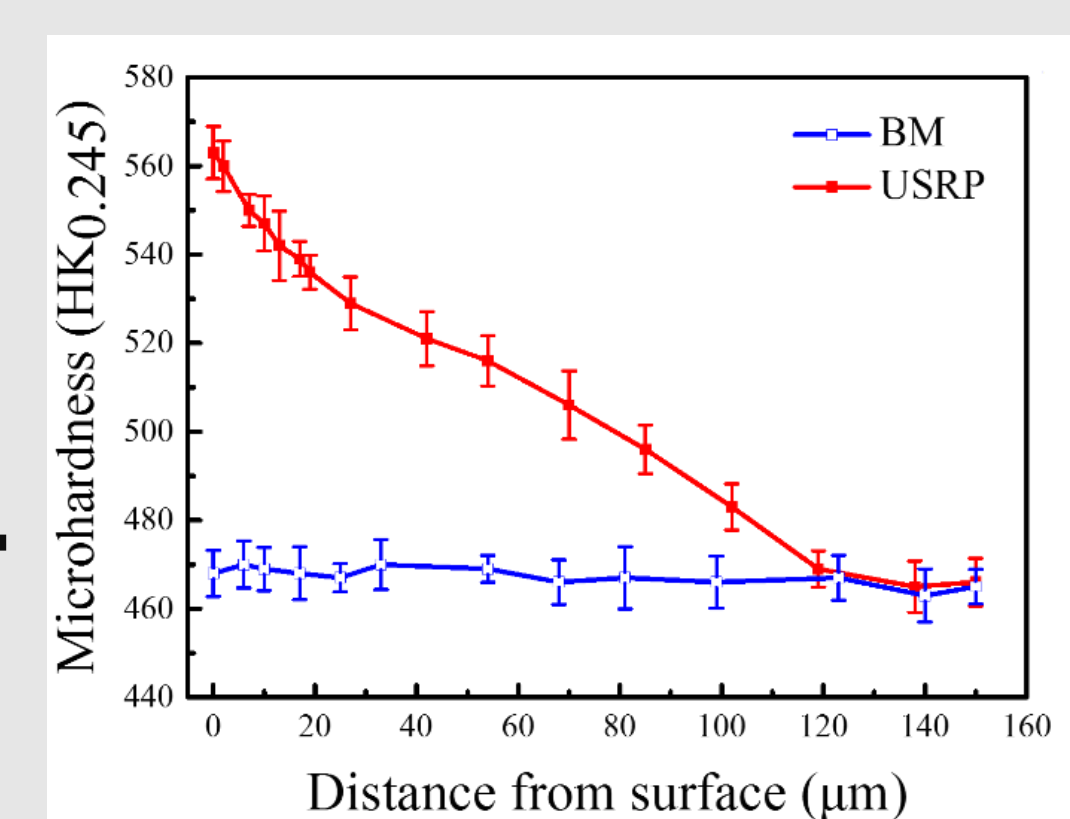
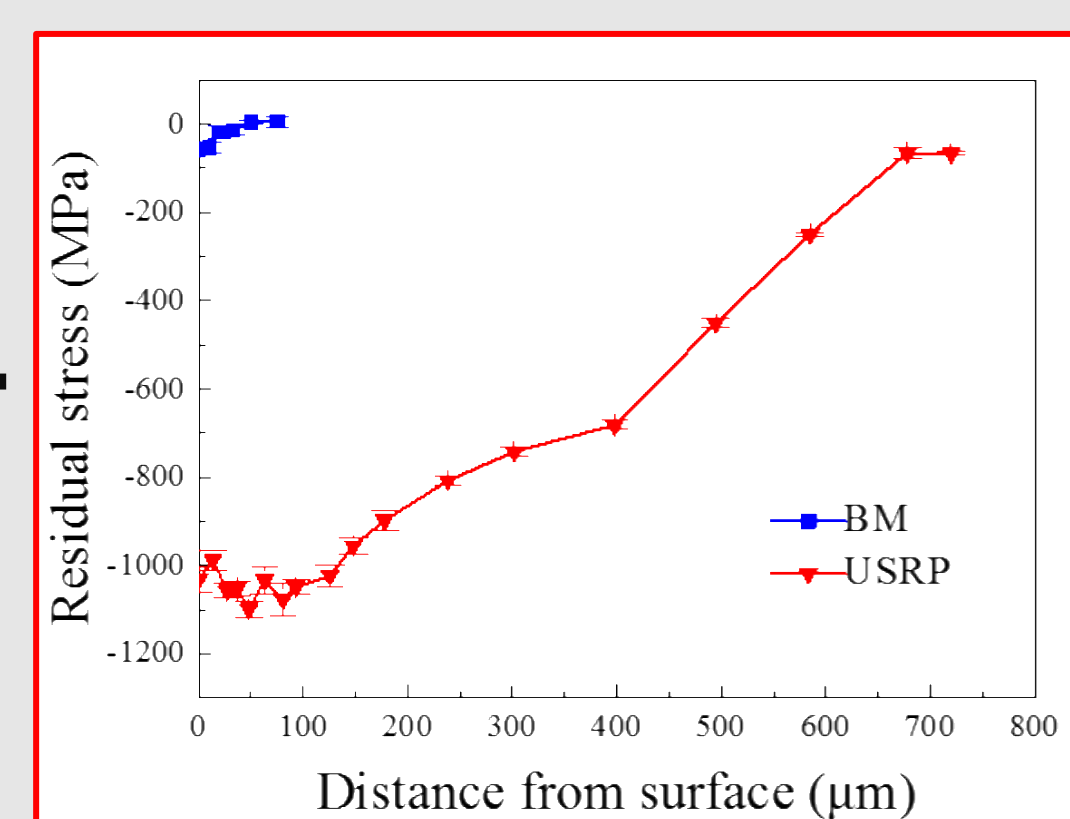
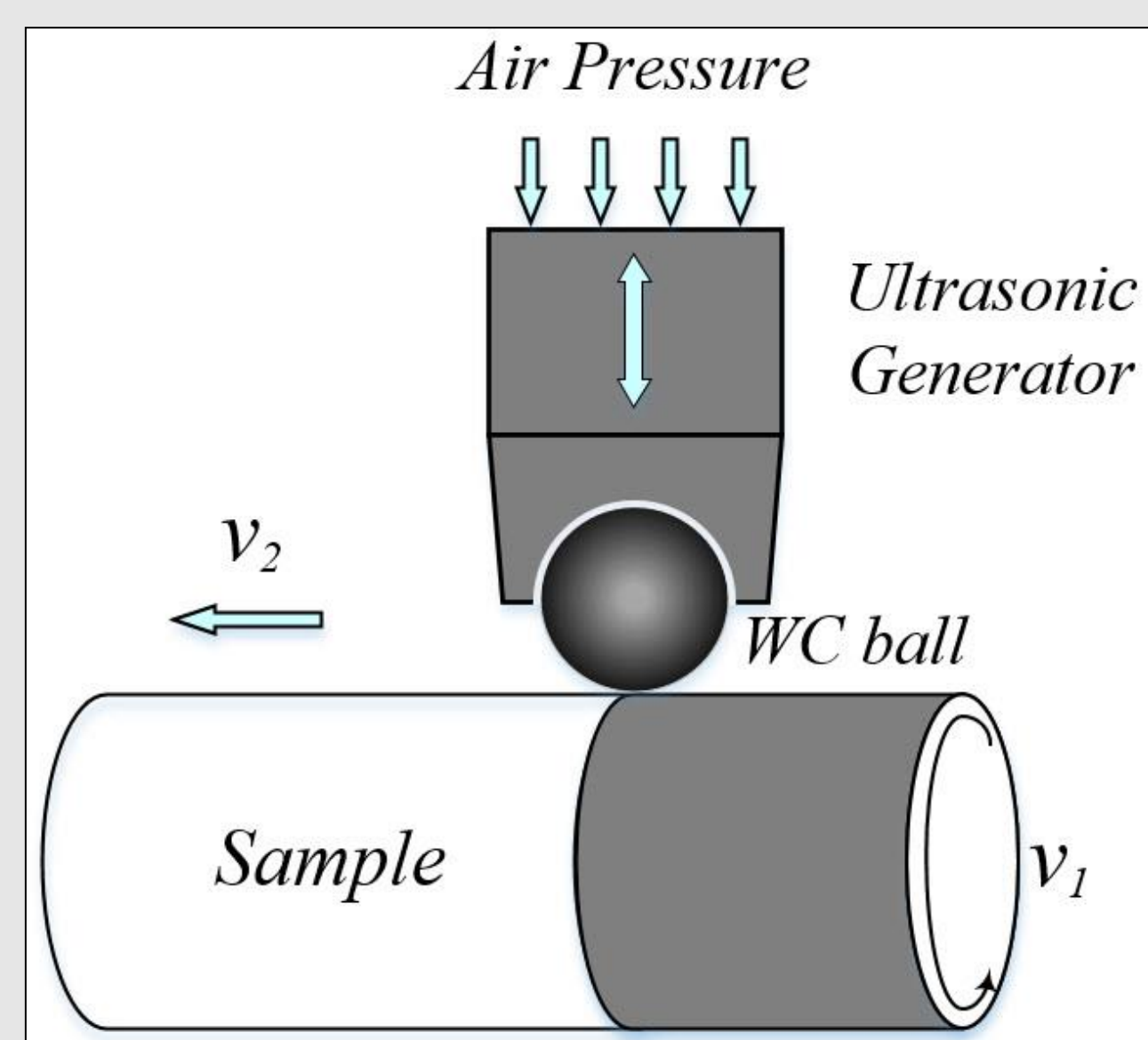
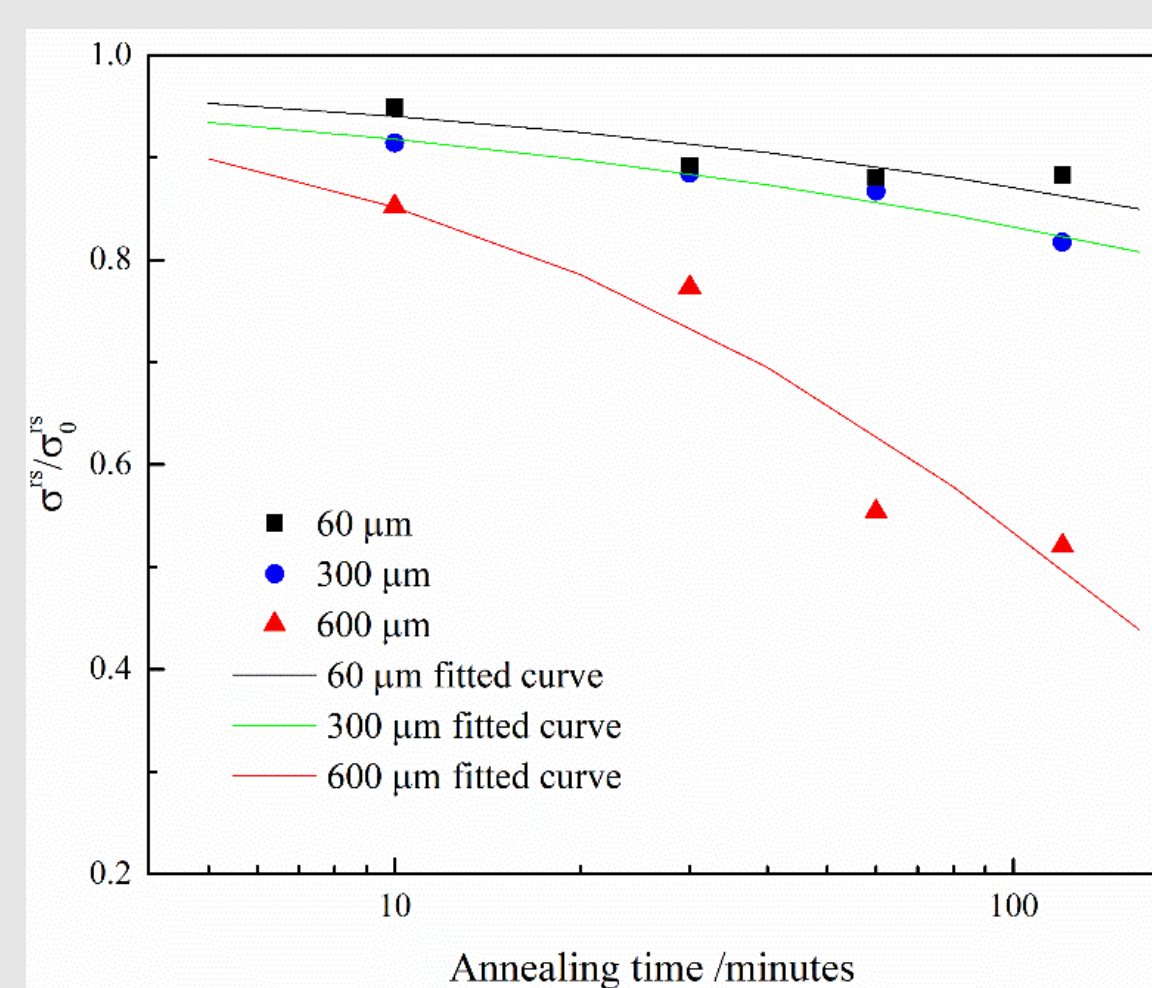
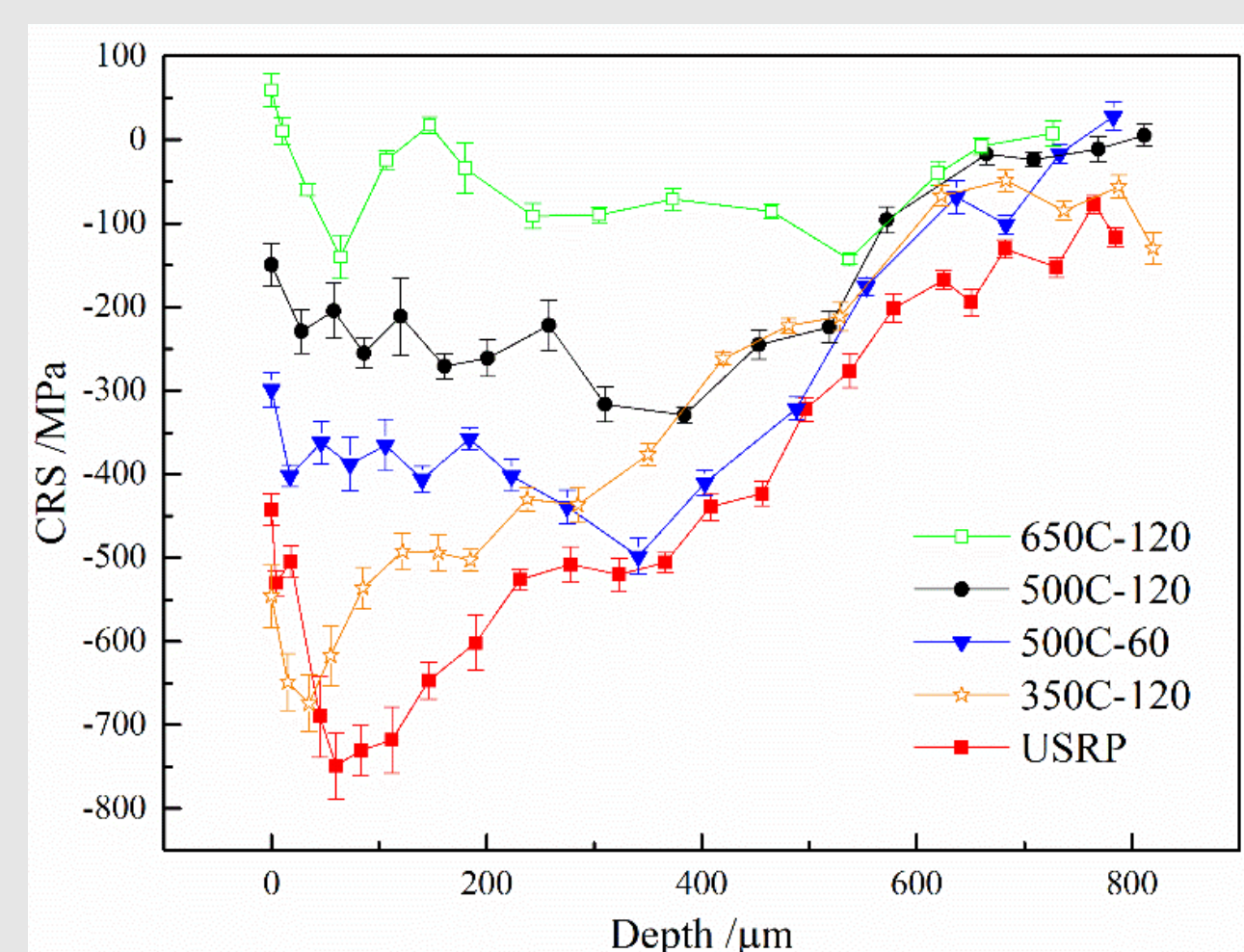


FINITE ELEMENT MODEL FOR FF CONSIDERING CRS RELAXATION UNDER HIGH TEMPERATURE



USRP

Ultrasonic surface rolling process (USRP) can improved the fatigue and fretting fatigue (FF) lives, since it can reduce the surface roughness, and introduce gradient distributed compressive residual stress (CRS) and nanocrystalline.

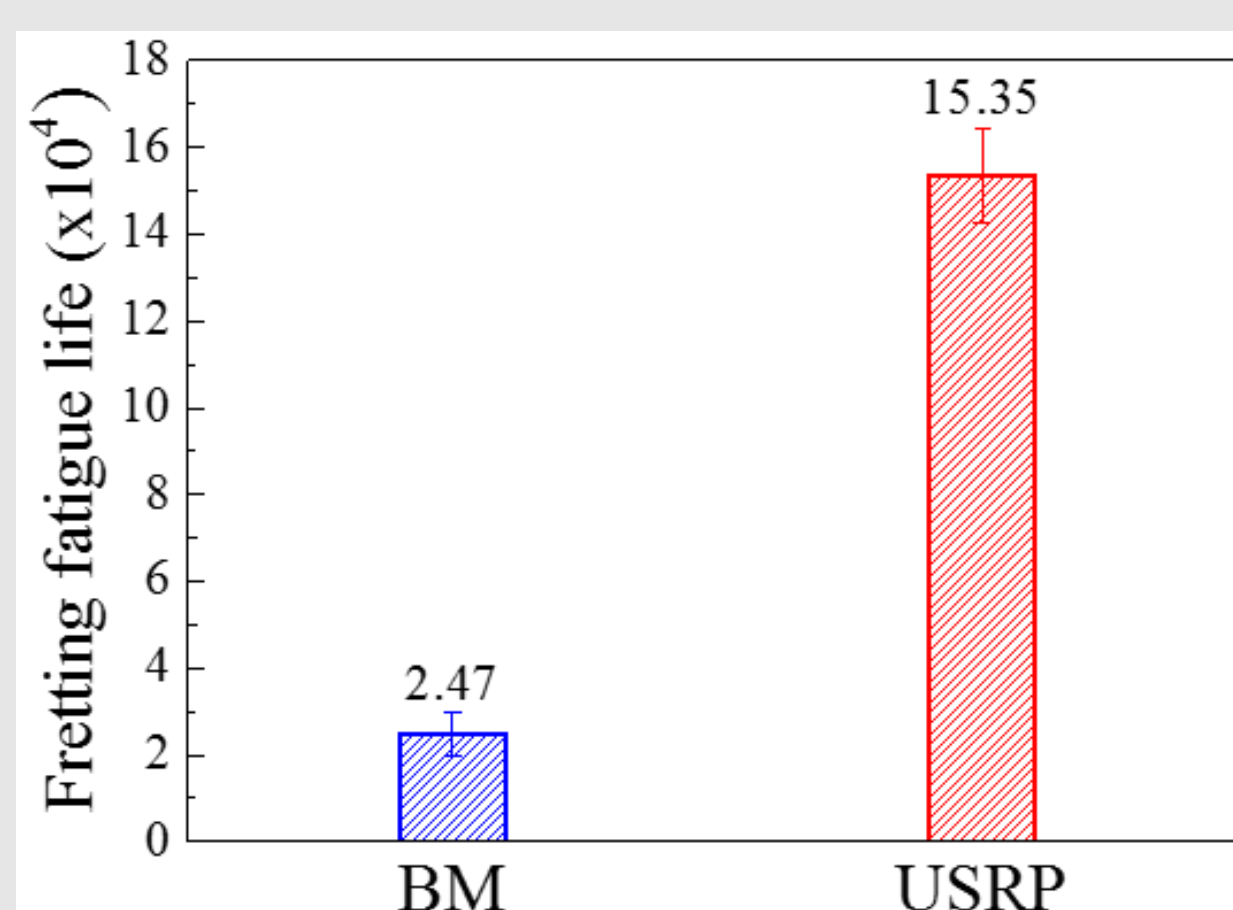
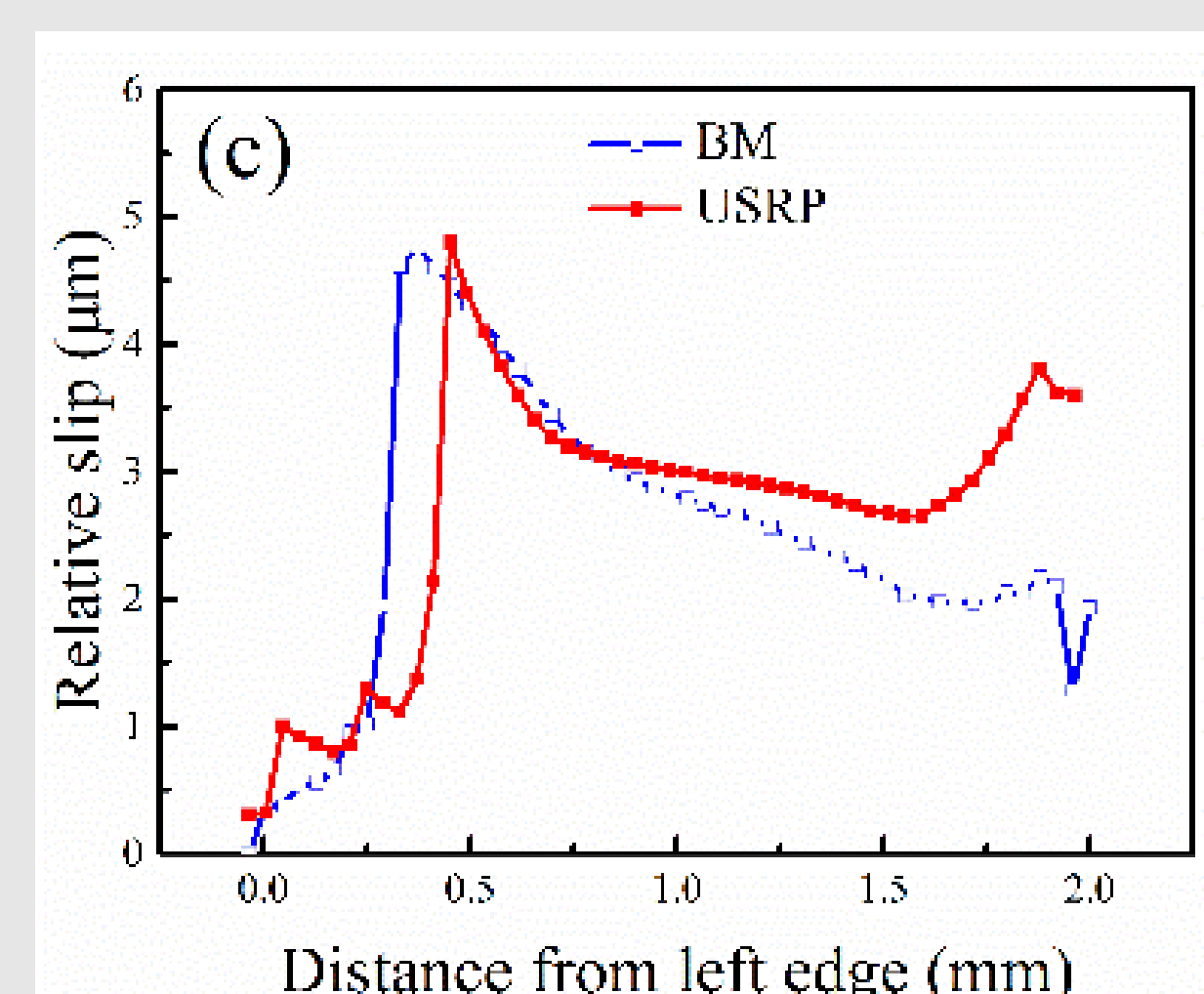
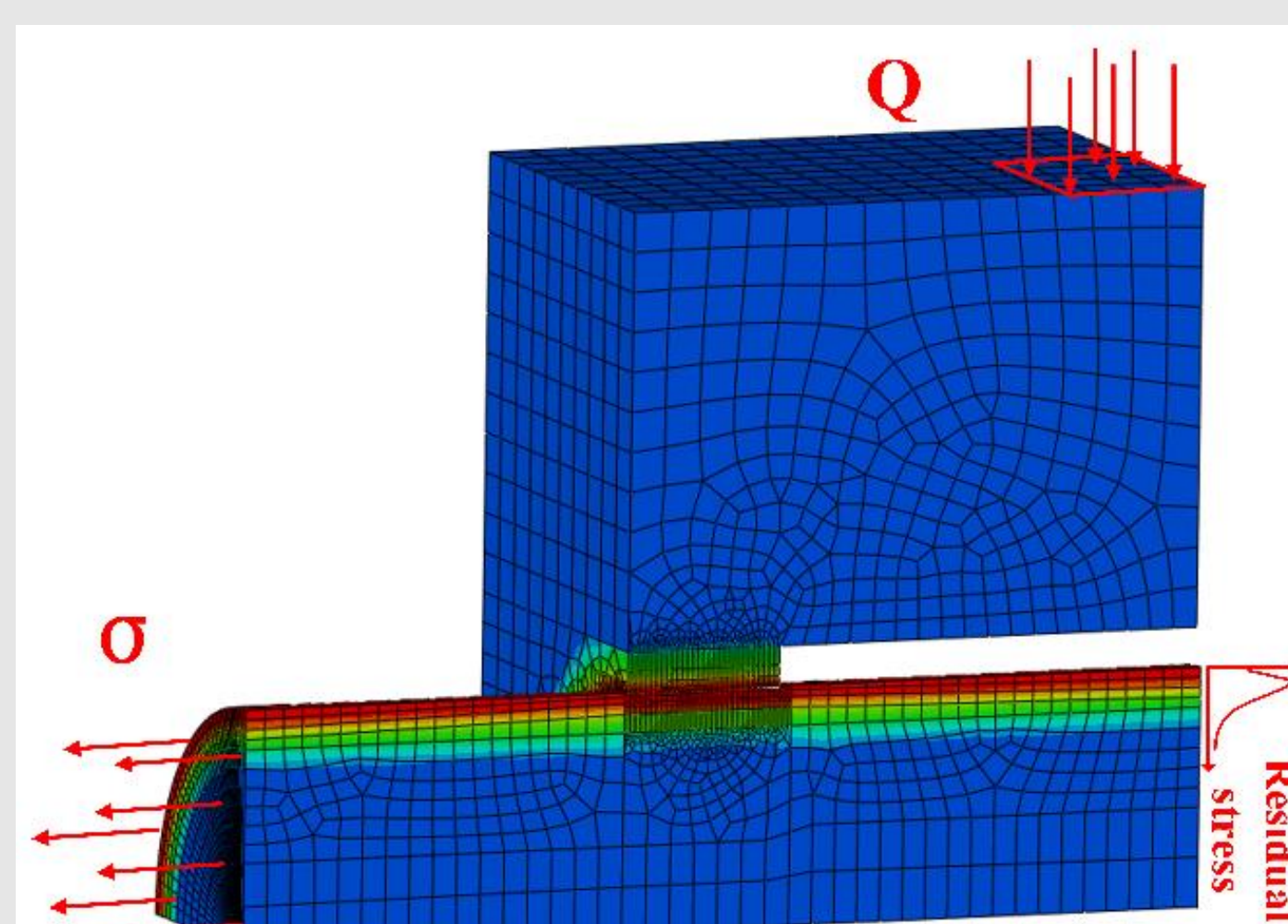
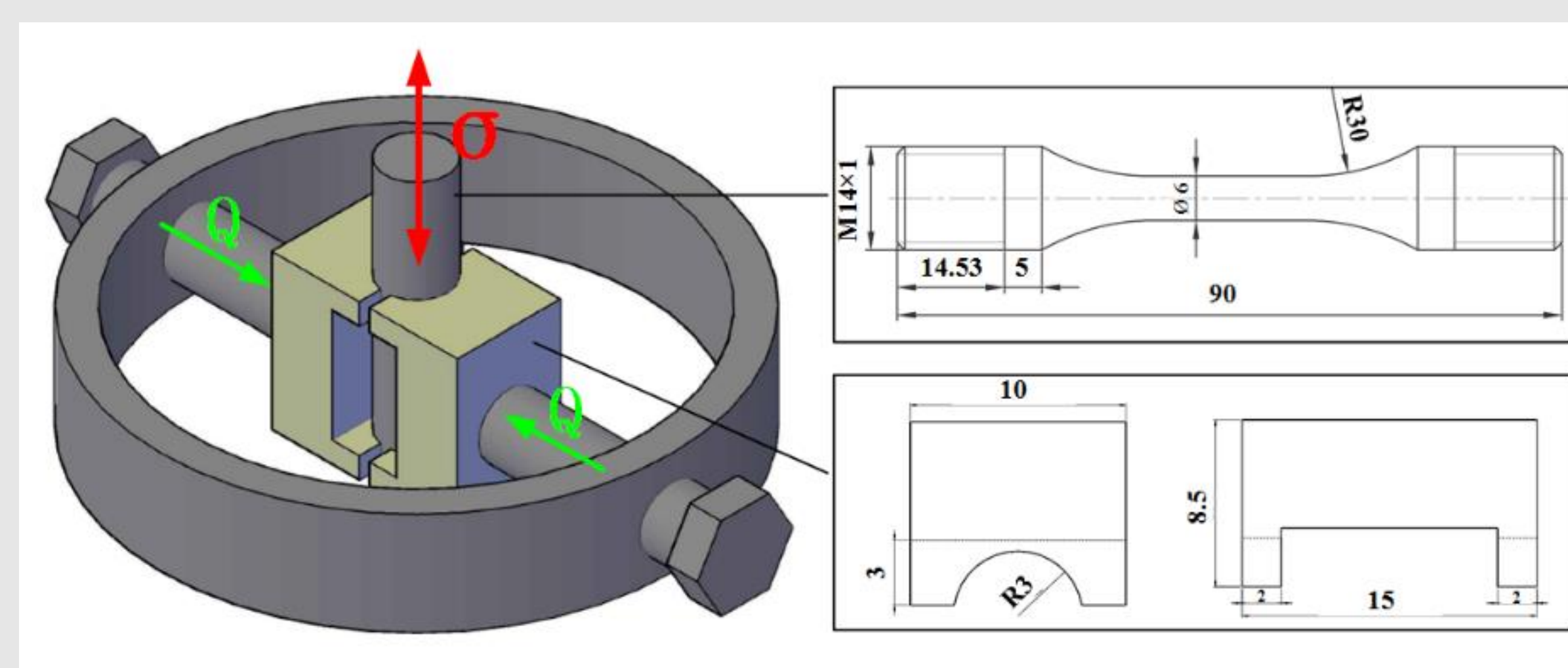


$$\frac{\sigma^{rs}}{\sigma_0^{rs}} = \exp[-(At_a)^m] \quad (1)$$

$$A = B \exp \left[-\frac{\Delta H}{\kappa T_a} \right] \quad (2)$$

CRS Relaxation

CRS relaxation happened under fatigue loading and high temperature environment, ZWA equation was effective in predicting the relaxation.



FF prediction

Numerical methods were applied in studying the FF behavior after USRP, including FF initiation position, direction and life, where CRS relaxation was considered. The predicted results combined well with experimental results.

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