Figure S1. The micro-topography under different roughness.
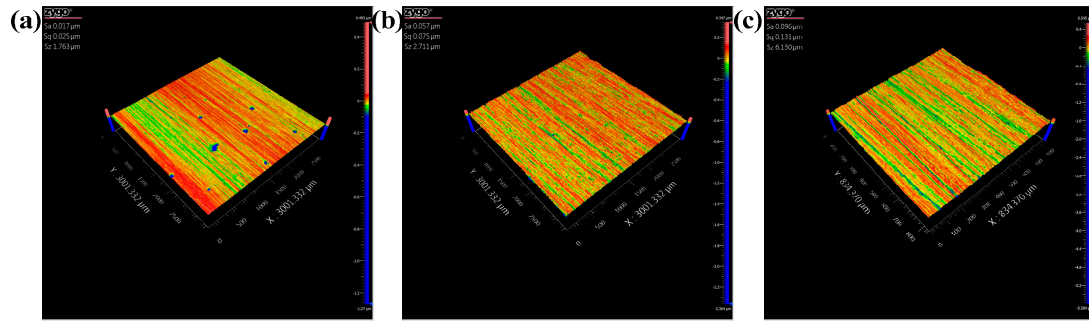

Figure S1. The micro-topography under different roughness: (a) *Sa* 0.017μm; (b) *Sa* 0.057μm; (b) *Sa* 0.096μm.

Table S1. The relative errors under *Sa* 0.017μm.

Dimensionless contact load	1.97E-06	3.95E-06	5.90E-06	7.83E-06	9.85E-06	1.18E-05	1.37E-05	1.57E-05	1.77E-05	1.95E-05
Proposed model	6.29%	7.61%	8.51%	5.22%	5.97%	6.95%	8.62%	3.14%	8.28%	5.01%
Pan model	15.72%	20.05%	22.14%	18.32%	19.69%	20.98%	22.76%	16.91%	22.77%	19.29%
YK model	33.79%	35.89%	40.94%	37.36%	39.10%	40.70%	42.62%	36.95%	43.41%	39.18%

Table S2. The relative errors under *Sa* 0.057μm.

Dimensionless contact load	1.97E-06	3.95E-06	5.90E-06	7.83E-06	9.85E-06	1.18E-05	1.37E-05	1.57E-05	1.77E-05	1.95E-05
Proposed model	5.20%	6.28%	8.51%	4.01%	3.39%	2.08%	7.27%	5.85%	7.72%	6.06%
Pan model	18.85%	18.61%	22.35%	17.50%	16.80%	15.22%	21.62%	19.79%	21.69%	20.10%
YK model	28.03%	30.21%	37.40%	36.43%	35.20%	35.15%	41.97%	39.23%	41.58%	39.94%

Table S3. The relative errors under *Sa* 0.096μm.

Dimensionless contact load	1.97E-06	3.95E-06	5.90E-06	7.83E-06	9.85E-06	1.18E-05	1.37E-05	1.57E-05	1.77E-05	1.95E-05
Proposed model	7.83%	8.74%	6.39%	5.31%	5.85%	4.99%	7.95%	5.52%	4.57%	6.07%
Pan model	30.11%	28.96%	23.91%	23.19%	22.63%	21.89%	25.50%	22.67%	20.90%	22.69%
YK model	46.20%	47.36%	45.46%	46.47%	48.71%	47.83%	50.62%	48.50%	44.99%	48.16%