

Table S3

Step voltages and maximum voltage settings for each particle size under different operating conditions for CS+EAC.

CS Temp (°C)	25	150	250	350			
Dilution ratio (DR)	4		1	2	3	4	
15 nm	3 360 V	2 240 V	2 240 V	1 120 V	2 240 V	2 240 V	2 240 V
23 nm	5 600 V	5 600 V	5 600 V	2 240 V	3 360 V	3 360 V	4 480 V
30 nm	7 840 V	7 840 V	6 720 V	3 360 V	4 480 V	5 600 V	6 720 V
50 nm	19 2280 V	19 2280 V	19 2280 V	5 600 V	8 960 V	14 1680 V	19 2280 V
70 nm	31 3720 V	31 3720 V	31 3720 V	10 1200 V	18 2160 V	25 3000 V	31 3720 V
100 nm	35 4200 V	35 4200 V	33 3960 V	20 2400 V	30 3600 V	32 3840 V	32 3840 V

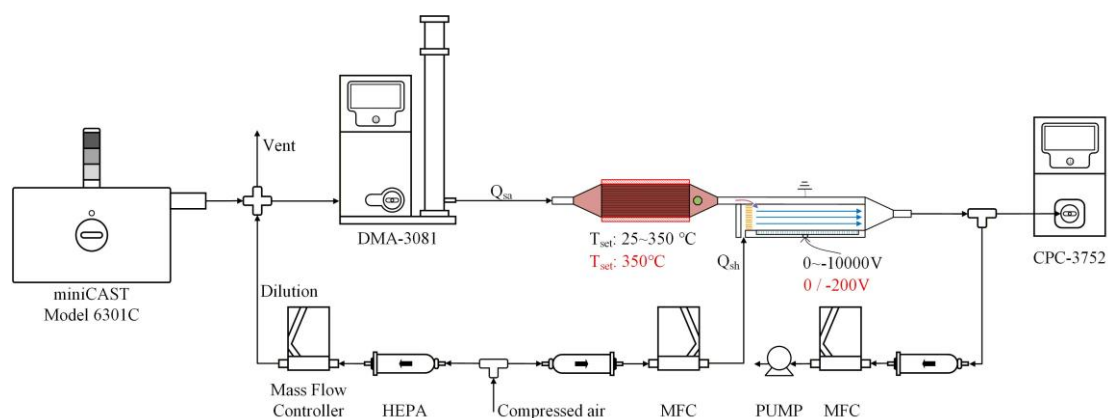
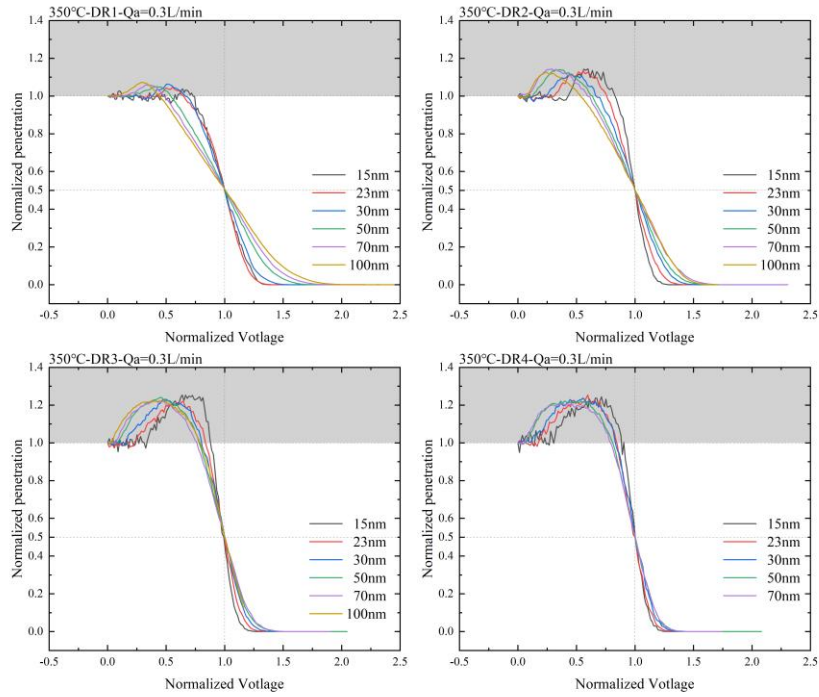
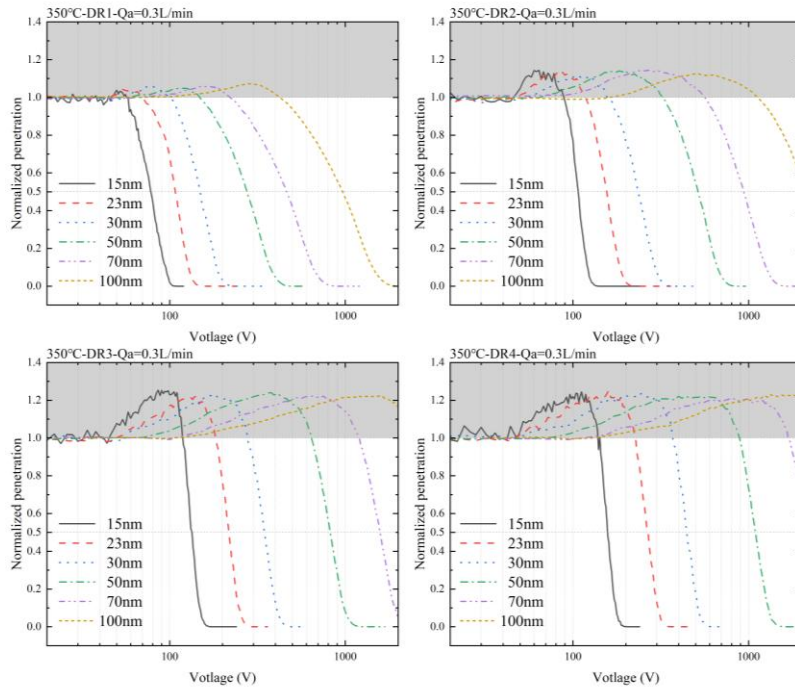


Figure S3: Voltage-penetration efficiency curve experiment setup for CS+EAC.



(a)



(b)

Figure 6: Voltage-penetration efficiency curves for CS+EAC under varying DRs: (a) normalized voltage, (b) applied voltage.

Figure S11 supplements Fig. 9b in the main text by providing a clearer illustration of the particle size distribution trend from 0 V to -300 V. It also demonstrates the improved penetration efficiency of small particles as the voltage gradually increases.

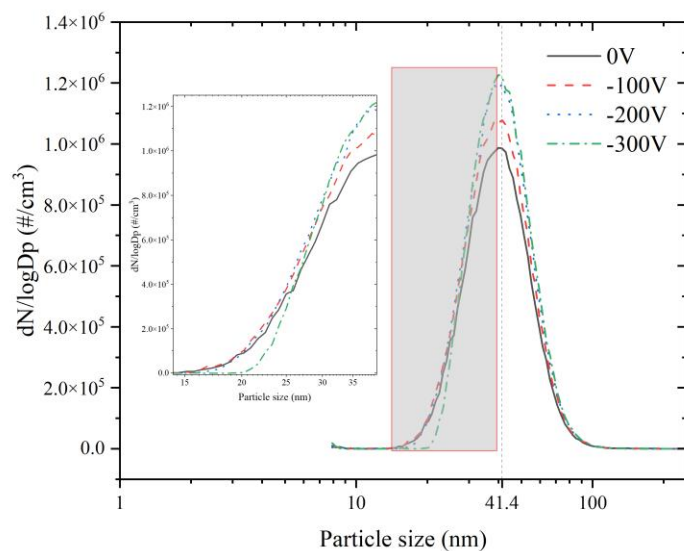


Figure S11: Particle size distribution trends from 0 V to -300 V, with the CS+EAC set at 350 °C and DR 4.