

Table S1: Effect of material concentration on chromium removal

Synthesis Volume (mL)	Average Removal (%)
20	75.13
40	74.28
80	66.72

Table S2: PANI-NSA synthesis conditions

	Normal	Optimised	Unit
2-NSA	0.208	0.208	g
Water for 2-NSA	80	20	mL
Aniline	0.2	0.2	mL
Temperature	5	15	°C
APS	0.456	0.456	g
Water for APS	10	2.5	mL

Table S3: Isotherm parameters

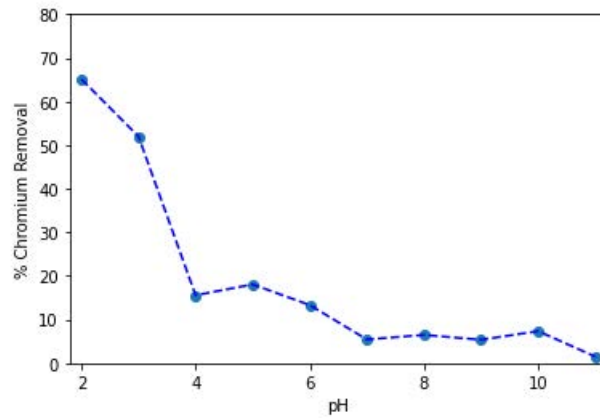
Best-fit values	Normal conditions	Optimised conditions
SS Langmuir		
R^2	0.9547	0.9410
q_{max}	374.9	438.2
K_{l_1}	0.03911	0.03791
DS Langmuir		
R^2	0.9703	0.9410
$q_{max,1}$	614.438	438.2
K_{l_1}	0.00124	0.0379
$q_{max,2}$	243.9	0.000002
K_{l_2}	0.07002	2030
Redlich-Peterson		
R^2	0.9664	0.9410
K_r	20.99	16.61
α	0.1510	0.03793
β	0.8104	0.9999
Freundlich		
R^2	0.9472	0.8907
K_f	39.06	43.05
n	2.376	2.317

Table S4: Kinetic parameters

Best-fit values	Normal conditions	Optimal conditions
Wang		
R^2	0.9670	0.9738
$q_{e,slow}$	29.19	34.33
k_{slow}	0.00961	0.01631
k_{fast}	0.6675	0.8078
q_e	57.53	59.37
Elovich		
R^2	0.9624	0.9582
α	66.78	33.31
β	0.1503	0.1172
PSO		
R^2	0.8651	0.8729
K_2	0.006115	0.003264
q_{e_2}	45.72	52.54
PFO		
R^2	0.7621	0.7756
K_1	0.2199	0.1292
q_{e_1}	41.83	47.38

Table S5: Comparison with literature

PANI-Based Adsorbents	q_{max} (mg/g)	Reference
PANI-Fe/OMC Composite	172.3	[26]
PANI Confined in SC/HA/PVA Hydrogel	1180.97	[27]
PANI-Decorated Macadamia Nutshell	384.6	[28]
PANI/PVA/AFL Composite Gel Beads	51.5	[29]
PANI-NSA	438.2	This study

**Figure S1:** Effect of temperature on Cr(VI) removal