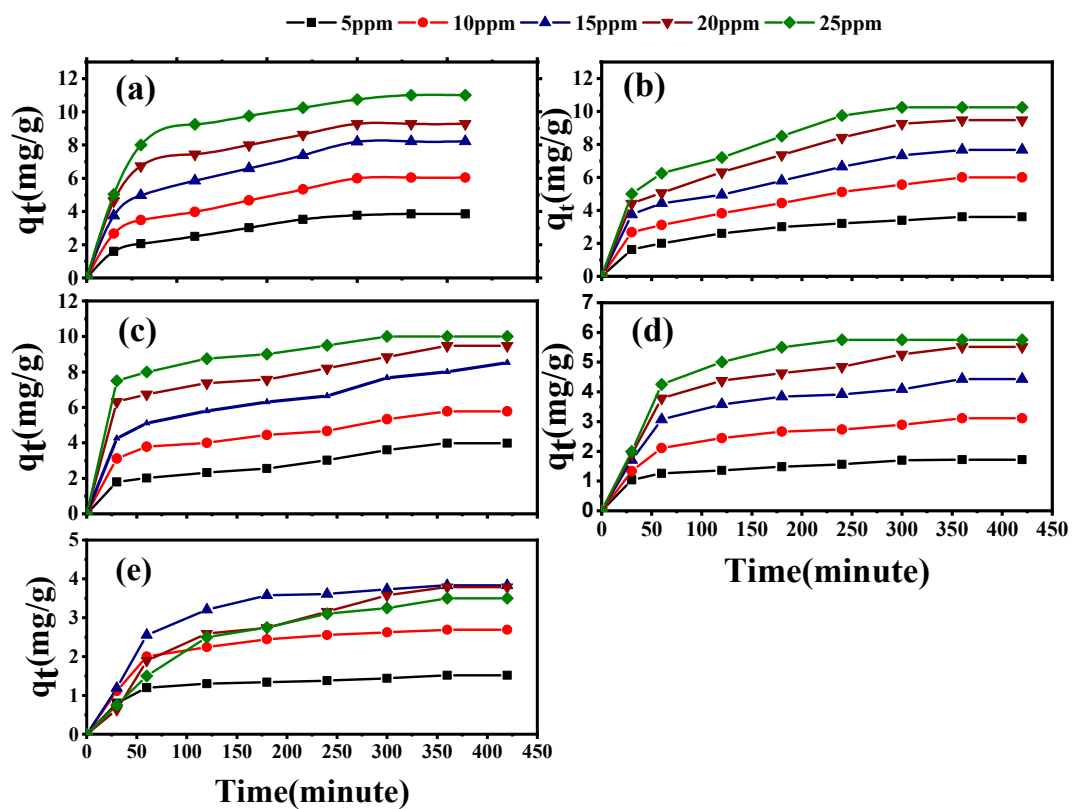
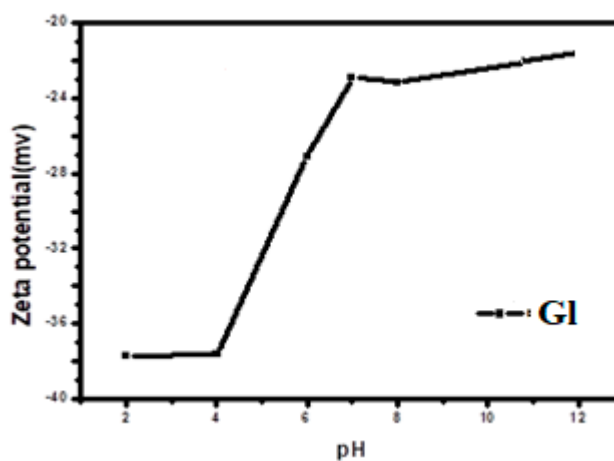


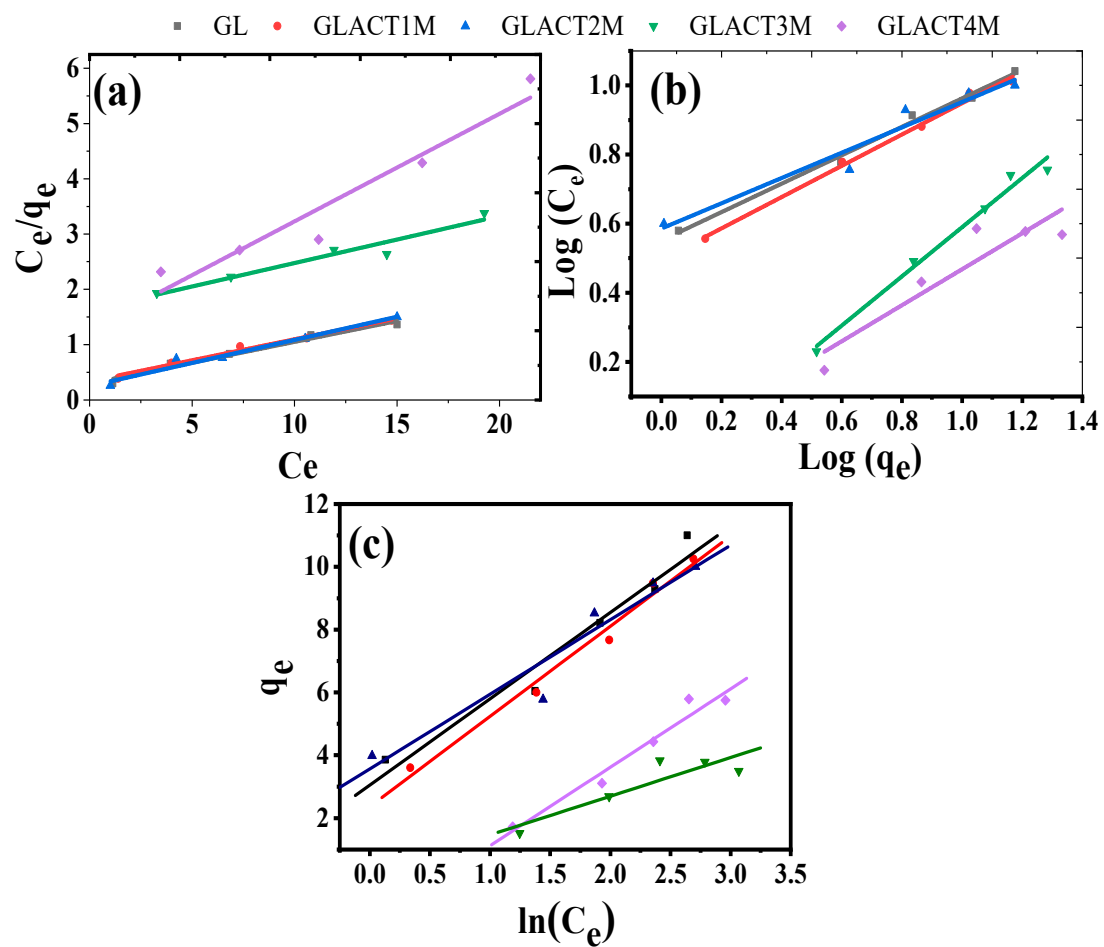
**Figure S1.** Schematic representation for mechanism of interaction between CR and glauconite.



**Figure S2.** Effect of CR dye concentrations and contact time on the adsorbed quantity of CR dye at 25 °C and pH 7 by 20 mg of (a)GL (b) GLACT1M (c)GLACT2M (d) GLACT3M and (d) GLACT4M.



**Figure S3.** The zeta potential for GL as a function of pH.



**Figure S4.** Plots of adsorption isotherms for the adsorption of CR dye by 20 mg of GL, GLACT1M, GLACT2M, GLACT3M, and GLACT4M at 25°C and pH 7; (a) Langmuir isotherms model, (b) Freundlich isotherms model and (c) Tempkin isotherms model.

**Table S1.** Conditions of experimental tests. CR dye adsorption tests were carried out using a range of parameters, including starting dye concentrations, adsorbent dosages, pH values, and temperatures.

Series	Dye concentration, ppm	Adsorbent dose, g	Temperature, °C	pH value
1	5, 10, 15, 20 and 25	0.02	25	7
2	5	0.02, 0.04, 0.06, 0.08 and 0.1	25	7
3	5	0.02	25, 40, 50, 60, 70, 80 and 90	7
4	5	0.02	25	2, 4, 6, 7, 8 and 12

**Table S2.** Parameters of the kinetic models for CR dye adsorption on GL, GLACT1M, GLACT2M, GLACT3M, and GLACT4M.

Catalyst	Conc, (ppm)	First order				Second order				Elovich kinetic model		
		$q_{e calc}$	$q_{e exp.}$	$k_1$	$R^2$	$q_{e calc}$	$q_{e exp.}$	$k_2$	$R^2$	$\beta$ (g/mg)	$\alpha$ (mg/min)	$R^2$
GL	25	2.84	11.00	0.0044	0.4314	12.02	11.00	0.0022	0.9990	0.4689	0.2365	0.9455
	20	3.53	9.28	0.0039	0.6656	10.18	9.28	0.0025	0.9975	0.5790	0.4281	0.9673
	15	4.07	8.22	0.0066	0.2841	9.42	8.22	0.0017	0.9925	0.5579	0.0866	0.9802
	10	3.02	6.04	0.0052	0.2946	7.08	6.04	0.0020	0.9860	0.7276	0.1114	0.9632
	5	1.83	3.86	0.0038	0.2484	4.60	3.86	0.0028	0.9891	1.0647	0.1758	0.9718
GLACT1M	25	4.55	10.25	0.0047	0.6663	11.71	10.25	0.0016	0.9926	0.4568	0.0690	0.9689
	20	5.21	9.47	0.0056	0.5906	11.09	9.47	0.0012	0.9878	0.4670	0.0337	0.9621
	15	3.94	7.67	0.0045	0.6381	8.84	7.67	0.0016	0.9818	0.6227	0.1203	0.9425
	10	3.18	6.00	0.0039	0.6602	7.05	6.00	0.0017	0.9822	0.7331	0.0972	0.9573
	5	1.34	3.60	0.0024	0.2150	4.11	3.60	0.0039	0.9960	1.2513	0.3082	0.9931
GLACT2M	25	1.87	10.00	0.0023	0.4191	10.46	10.00	0.0049	0.9983	0.9736	48.555	0.9765
	20	3.21	9.47	0.0035	0.7887	10.08	9.47	0.0027	0.9886	0.8096	5.6616	0.9072
	15	4.77	8.52	0.0048	0.8429	9.26	8.52	0.0018	0.9774	0.6488	0.2788	0.9376
	10	2.37	5.78	0.0030	0.5866	6.36	5.78	0.0028	0.9785	0.9961	0.6174	0.9187
	5	2.14	3.98	0.0028	0.5051	4.74	3.98	0.0021	0.9383	1.1472	0.2204	0.8659
GLACT3M	25	1.83	5.75	0.0024	0.2187	6.47	5.75	0.0037	0.9916	0.7584	0.1789	0.8666
	20	2.32	5.52	0.0037	0.4850	6.27	5.52	0.0027	0.9940	0.7980	0.1527	0.9358
	15	1.79	4.43	0.0031	0.3940	4.91	4.43	0.0041	0.9955	1.0646	0.3222	0.9383
	10	1.34	3.11	0.0026	0.2509	3.43	3.11	0.0061	0.9963	1.5834	0.5199	0.9680
	5	0.67	1.72	0.0027	0.0817	1.85	1.72	0.0158	0.9958	3.7942	1.1535	0.9789
GLACT4M	25	2.20	3.50	0.0050	0.5324	4.71	3.50	0.0016	0.9881	0.9343	0.0593	0.9895
	20	2.62	3.79	0.0052	0.5631	5.40	3.79	0.0011	0.9428	0.8631	0.0447	0.9770
	15	1.45	3.84	0.0054	0.3433	4.42	3.84	0.0041	0.9919	1.0608	0.2042	0.9131
	10	0.83	2.69	0.0043	0.2204	2.96	2.69	0.0086	0.9982	1.8132	0.6043	0.9145
	5	0.33	1.52	0.0012	0.0251	1.61	1.52	0.0205	0.9974	4.1411	1.0913	0.9145

**Table S3.** Intra-particle diffusion constant for GL, GLACT2M, and GLACT4M for adsorption of 15 ppm CR at 25°C.

Catalyst	Stage	Intraparticle diffusion kinetic model	
		$k_3$ ( mg/g min <sup>1/2</sup> )	R <sup>2</sup>
GL	1	0.30935	0.96291
	2	0.18142	0.99410
	3	0.06367	0.99977
GLACT2M	1	0.59293	0.97897
	2	0.37781	0.99886
	3	0.13992	0.96067
GLACT4M	1	0.34183	0.97008
	2	0.07681	0.97550
	3	0.13992	0.96067