

Table 1. Results of N₂ physisorption, surface acidity and pH_{PZC} measurements for samples investigated in this study [13,19].

Sample	S _{BET}	V _{pore}	Density of acid sites	Quantity of acid sites	T of desorption of pyridine	pH _{PZC}
	m ² /g	cm ³ /g	mmol/m ²	mmol/g	°C	
Black sand	0.6	0.002	0.0011	7.2×10 ⁻⁴	240, 290, 376	7.9
Diatomite	133	0.29	0.0013	0.18	209	8.5
Pumice	1.2	0.003	0.0013	9.8×10 ⁻⁴	170, 245, 340	8.7
Montanit300®	36	0.07	0.0038	0.14	259	8.9

Table 2. Results of SEM-EDX analysis of investigated samples [13,19].

Sample	SEM-EDX composition, wt.%										
	O	Al	Si	Ti	Mn	Fe	Ca	Na	Mg	K	C
Black sand	26.8	2.0	1.82	28.2	2.1	39	-	-	-	-	-
Diatomite	39.2	4.7	33.0	-	-	3.0	0.23	0.2	1.6	-	18
Pumice	56.5	5.3	29.6	-	-	1.0	2.0	2.0	0.70	2.5	-
Montanit300®	51.8	6.7	29.6	-	-	5.9	1.8	1.0	1.4	1.8	-

Table 3. Freundlich and Langmuir isotherm parameters and kinetics constants.

Adsorbent	pH _{eq}	Adsorption isotherms								Adsorption kinetics			
		Freundlich				Langmuir				Pseudo-first order		Pseudo-second order	
		R ²	n	K_F	K'_F	R ²	Q_{max}	Q'_{max}	K_L	k_1	R ²	k_2	R ²
				(mg ⁿ⁻¹ × L ⁿ /g)	(mg ⁿ⁻¹ × L ⁿ /m ²)		(mg/g)	(mg/m ²)	(L/mg)	(1/min)		(g/(mg min))	
Black sand	8.01	0.99	0.54	0.019	0.032	0.99	0.065	0.11	0.42	0.003	0.93	0.3	0.96
Diatomite	7.91	0.92	0.59	0.0067	0.00005	0.97	0.033	0.00025	0.24	0.063	0.98	12	0.95
Montanit300®	8.19	0.99	0.67	0.0069	0.00019	0.99	0.038	0.0011	0.22	-	-	-	-

Table 4. Langmuir maximum saturated monolayer adsorption capacity reported in literature by different geo-adsorbents.

Natural Geo-adsorbent	pH	T	As(V) Langmuir adsorption capacity	Equilibrium time	Ref.
		°C	mg/g		
Zeolite rich rocks	4	23	0.006-0.1	7 days	Elizalde Gonzales et al. 2001
Iron sand	6.7-6.8	Room T	0.024	24-48 h	Mar el at. 2007
Laterite soil	5.7	25	0.04	4 h	Maji et al. 2007
Croatian and Serbian Na- zeolite		25	0.036-0.07	3 h	Šiljeg et al. 2012
Diatomite	8	Room T	0.033	24 h	This study
Montanit	8	Room T	0.038	24 h	This study
Black sand	8	Room T	0.065	Seconds	This study
Shale	7.5-7.8	Room T	0.138	24-48 h	Mar et al. 2007
Pumiceous tuffs, volcanic ashes, marine sediments	6	Room T	0.287-3.15	24 h	Tabelin et al. 2014
Bentonite	6.5-7	Room T	0.334	24-48 h	Mar et al. 2007
Moroccan clays	7	Room T	0.561- 1.076	4-10 days	Bentahar et al. 2016
Lateritic soil	7	25	2	24 h	Boglione et al. 2018

Table 5. Arsenic desorption percentage by using HNO₃ and NaOH (0.01 mol/L); 24 h, 25°C, 25 g/L of adsorbent.

	Desorption (%)		
	Black sand	Montanit300 [®]	Diatomite
HNO ₃	17.5±1.3	37.6±2.4	85.0±4.7
NaOH	48.9±1.2	100±1	80.8±3.3