Name	**Chemical formula**	**Chemical composition** (oxides; %Wt; from literature)	**Mineral type**	**CEC** meq/100g (measured)	**Surface area** m^2/g (from literature)	**Proportion in the Gironde eq. solution** (10g/L)
Kaolinite (KGa-1B)	$Al_2Si_2O_5(OH)_4$	SiO_2: 44.2, Al_2O_3: 39.7, TiO_2: 1.39, Fe_2O_3: 0.13, FeO: 0.08, MnO: 0.002, MgO: 0.03, Na_2O: 0.013, K_2O: 0.05, F: 0.013, P_2O_5: 0.034 (3)	1:1	2	10,05 (1)	7.4%
Illite (Imt-2)	$(K,H_3O)(Al,Mg,Fe)_2(Si,Al)_4O_{10}[(OH)_2,(H_2O)]$	SiO_2: 49.3, Al_2O_3: 24.25, TiO_2: 0.55, Fe_2O_3: 7.32, FeO: 0.55, MnO: 0.03, MgO: 2.56, CaO: 0.43, K_2O: 7.83, P_2O_5: 0.08 (3)	1:2	4	105 (1)	57.3%
Ca-rich Montmo-rillonite (Saz-2)	$(Na,Ca)_{0,3}(Al,Mg)_2Si_4O_{10}(OH)_2$	SiO_2: 60.4, Al_2O_3: 17.6, TiO_2: 0.24, Fe_2O_3: 1.42, FeO: 0.08, MnO: 0.099, MgO: 6.46, CaO: 2.82, Na_2O: 0.063, K_2O: 0.19, F:0.287, P_2O_5: 0.020 (3)	1:2	114	97,42 (2)	27.8%
Ripidolite (Cca-2)	$(Fe,Mg,Al)6(Si,Al)4O_{10}(OH)_8$	SiO_2: 26.0, Al_2O_3: 20.0, TiO_2: 0.476, Fe_2O_3: 26.6, FeO: 20.8, MnO: 0.1, MgO: 17.2, CaO: 0.25, Na_2O:<0.1, K_2O: <0.1, P_2O_5: 0.02 (3)	1:2	0	2,5 (4)	11.1%

Table S1. Properties of clay mineral standards (The Clay Minerals Society; Chantilly, USA) used in clay-sand-EPS experiments.

Mechanism	**Organic functional groups**
Cation exchange	Amino
Cations bridging	Carboxylate, sulfate, alcoholic OH, carbonyl, amines
Water bridging	Carboxylate, sulfate, alcoholic OH, carbonyl, amines
Hydrogen bonding	Amino, carboxyl, alcoholic OH, carbonyl
Van der Waals interaction	Uncharged organic unit/moiety

Table S2. Potential mechanisms of interaction between EPS and mineral surfaces.

Wavenumber (cm^{-1})	**Vibrational modes**
3000-4000	O-H/N-H vibrations
2800-3000	Symmetric and antisymmetric stretching of C-H from CH_2 and CH_3 groups
1733	Stretching of C=O in protonated carboxylic acid group
1636	Stretching of C=O in amide (amide I)
1540	N-H bending and C-N stretching in amide (amide II)
1450	CH_2 scissoring
1373	Symmetric stretching of COO^-
1247	Vibrations of -COOH and C-O-C group in esters
1210	Stretching of P=O bond in phosphate
950-1150	Asymmetric and symmetric stretching of PO_2^-; vibrations of C-OH and C-C bonds in polysaccharides and alcohols

Table S3. FTIR Absorption bands of Gironde diatom biofilm EPS.

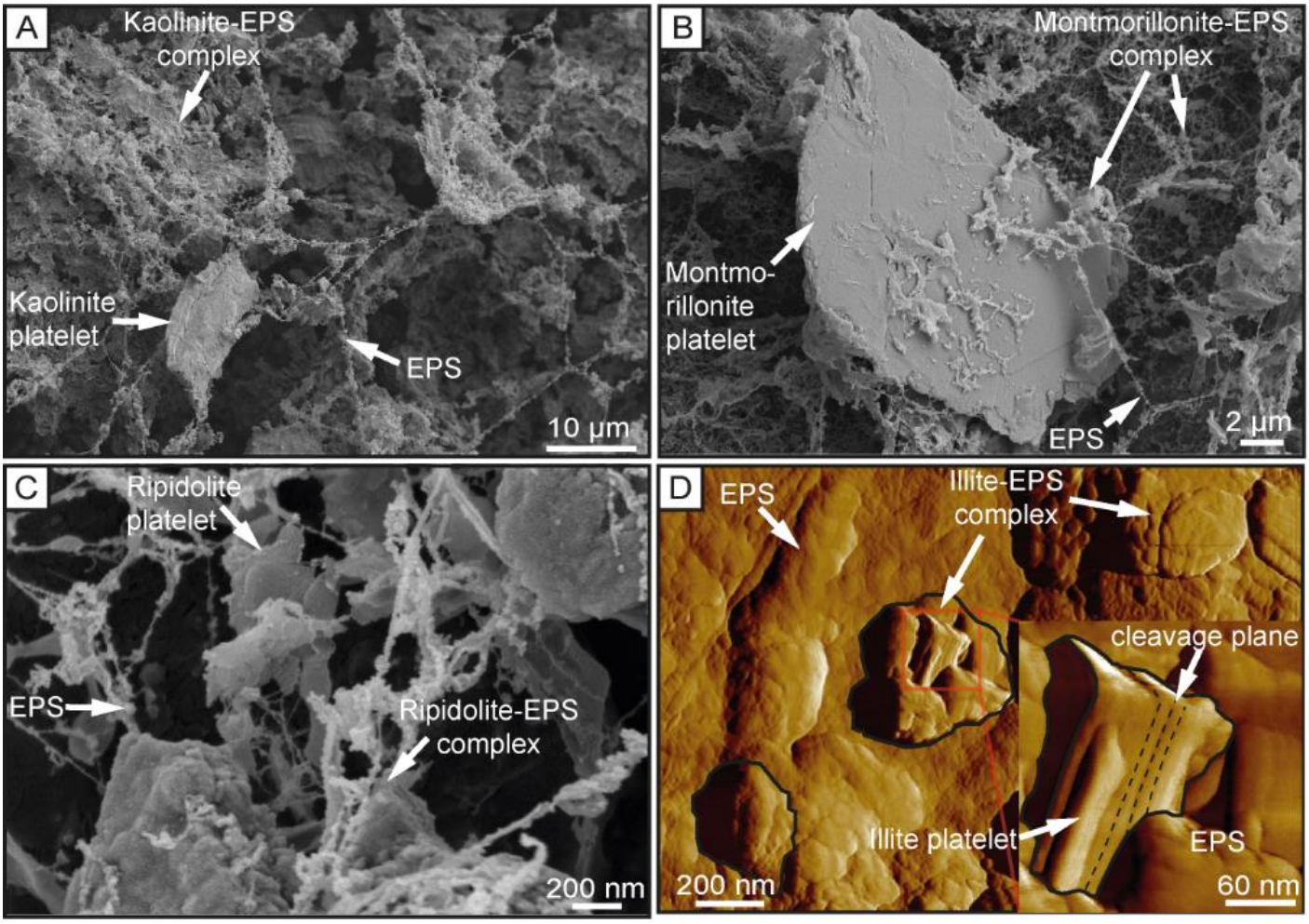

Figure S1. Experiments of interactions between EPS and the four species of standard clay minerals (Table S1). For each experiment, we prepared a solution of 245 µL of EPS solution and 105 µL of 10g/L clay suspension. (A) SEM image of the kaolinite (KGa-1b)-EPS experiment. The EPS matrix forms a complex with kaolinite platelets. (B) SEM image of the montmorillonite (Saz-2)-EPS experiment. The clay platelet is covered by EPS. (C) SEM image of ripidolite (Cca-2)-EPS experiment. An organo-mineral complexes is formed between EPS fibers and ripidolite platelets. (D) AFM image of the illite (Imt-2)-EPS experiment. Clay platelets are embedded within the EPS organic matrix. A close-up view shows the cleavage plane of the illite crystal.

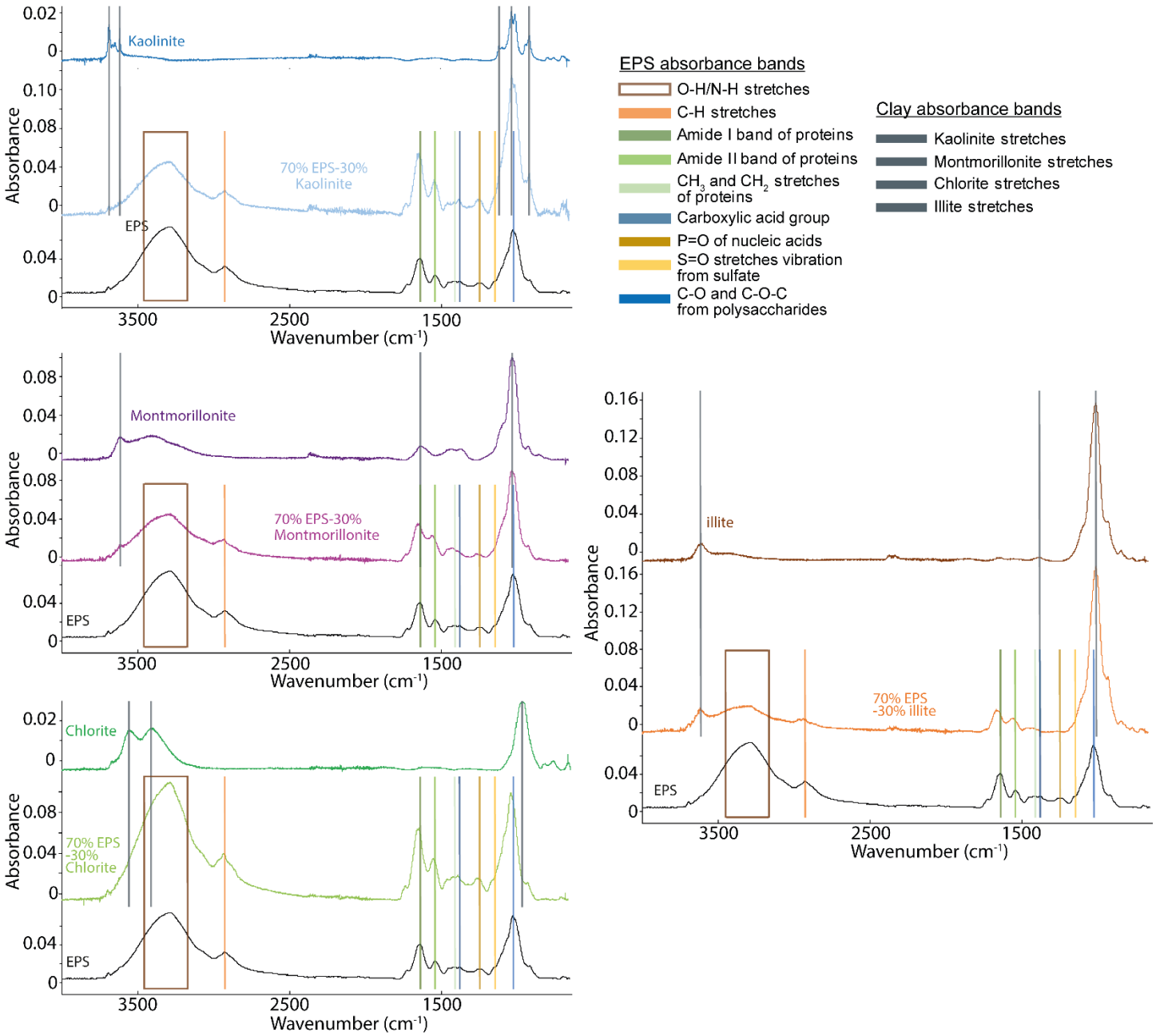

Figure S2. FTIR spectra of EPS and clay standard minerals experiments. See the caption of Fig. S2 and main text for detailed about experimental procedures.

References:

(1) Kahr, G., and Madsen, F.T., 1995, Determination of the cation exchange capacity and the surface area of bentonite, illite and kaolinite by methylene blue adsorption: Applied Clay Science, v. 9, p. 327–336.

(2) Lorenz, P.M., Meier, L., and Kahr, G., 1999, Determination of the cation exchange capacity (CEC) of clay minerals using the complexes of copper (II) ion with triethylenetetramine and tetraethylenepentamine: Clays and clay minerals, v. 47, p. 386–388.

(3) Mermut, A.R., and Cano, A.F., 2001, Baseline studies of the clay minerals society source clays: chemical analyses of major elements: Clays and Clay Minerals, v. 49, p. 381–386.

(4) Sondi, I., Stubičar, M., and Pravdić, V., 1997, Surface properties of ripidolite and beidellite clays modified by high-energy ball milling: Colloids and Surfaces A: Physicochemical and Engineering Aspects, v. 127, p. 141–149.