**Supporting Information**

**Evaluating of the methylene blue removal on plasma activated palygorskites**

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**Fig. S1.** Scheme of experimental setup, Ar – argon, H2 – hydrogen and N2 – nitrogen bottles, M1, M2 and M3 – mass flow controller, PV – pump vacuum, AE – air entrance, T- thermostate and VC – vacuum camera.

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**Fig. S2.** X-ray dispersive energy spectra for the pristine and plasma activated palygorskites.



**PAL-6H**

**PAL-4H**

**PAL-2H**

**PAL-N**

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| **Fig. S3.** Effect of adsorbent mass (m) on MB adsorption for the pristine and plasma activated palygorskites.

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**Fig. S4.** Effect of pH on MB adsorption by pristine and plasma activated palygorskites



**Fig. S5.** (a) Distribution of MB species at different pHs and (b) proposal for MB adsorption on the plasma activated palygorskites.

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| (1)(2) | (3) (4) |

**(**a)



(b)

**Fig. S6.** Linear fitting of the influence of time (t) on adsorption to the pseudo-first-order model for the methylene blue adsorption by PAL-N, PAL-2H, PAL-4H and PAL-6H.

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**Fig. S7** Linear fitting of the influence of time (t) on adsorption to the pseudo-second-order model for the methylene blue adsorption by PAL-N, PAL-2H, PAL-4H and PAL-6H.

**PAL-4H**

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**Fig. S8.** Linear fitting of the influence of time (t) on adsorption to intraparticle diffusion model for the methylene blue adsorption by PAL-N, PAL-2H, PAL-4H and PAL-6H.

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**Fig. S9.** Linear fitting of the adsorption data to Langmuir model for the methylene blue adsorption by PAL-N, PAL-2H, PAL-4H and PAL-6H.

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**Fig. S10.** Linear fitting of the adsorption data to Freundlich model for the methylene blue adsorption by PAL-N, PAL-2H, PAL-4H and PAL-6H.

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