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Supplementary Materials

Solvothermal Crystallization of Ag/Ag$_x$O-AgCl Composites: Effect of Different Chloride Sources/Shape-Tailoring Agents

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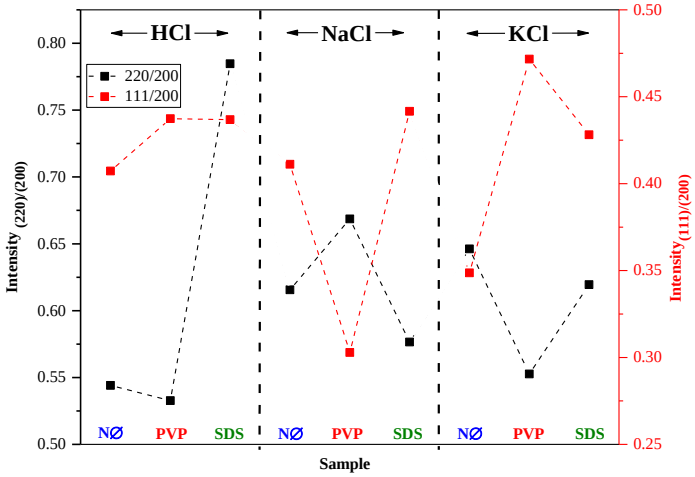

Figure S1. Structural properties of AgCl: Intensity ratios of (111)/(200) (**red** line) and (220)/(200) (**black** line) crystallographic planes.

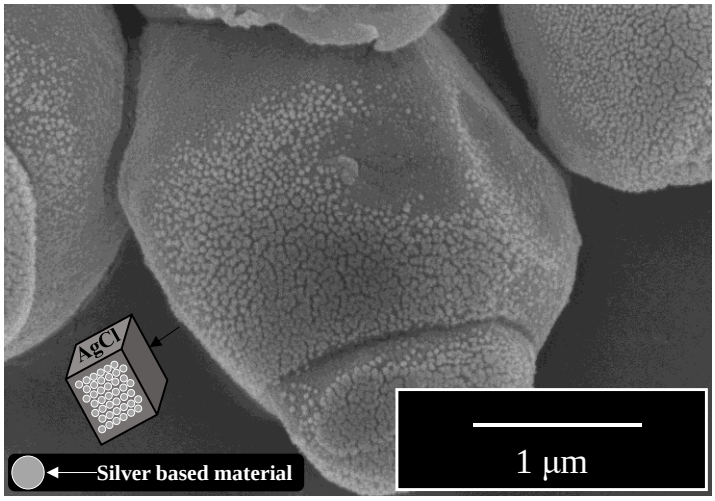

Figure S2. Appearance of small particles on the surface of the catalyst: SEM micrograph of AgCl_NaCl_SDS.

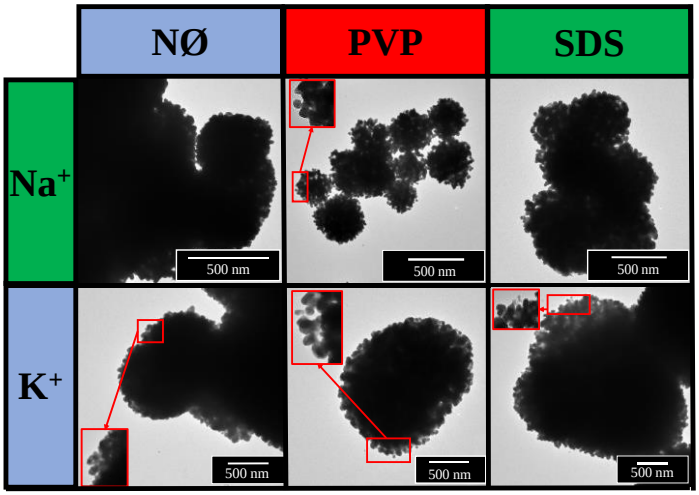

Figure S3. In-depth analysis of the AgCl microcrystal's morphology: transmission electron microscopy (TEM micrographs of AgCl photocatalysts prepared using different shape-tailoring agents (NØ; PVP and SDS), alkali metals (Na^+, K^+), and H^+.

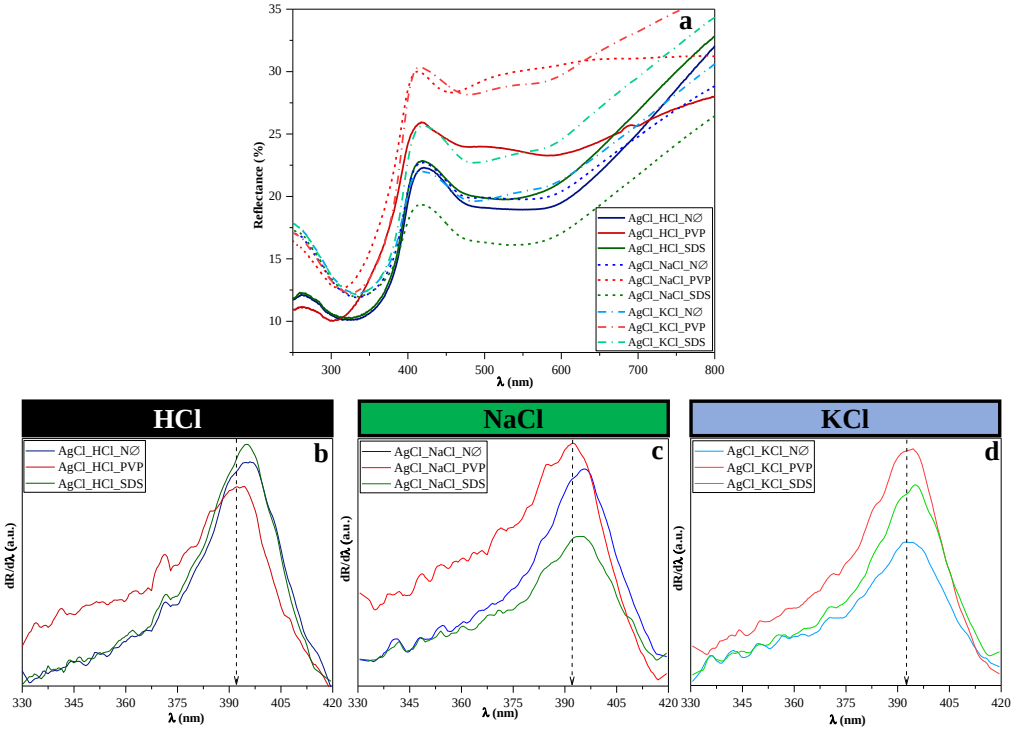

Figure S4. Optical parameters investigation of AgCl photocatalyst: (**a**) diffuse reflectance spectra (DRS) spectra using different shape-tailoring agents (NØ; PVP and SDS), alkali metals (Na^+, K^+), and H^+ and the first-order derivative of DRS spectra: (**b**) AgCl_HCl; (**c**) AgCl_NaCl; and (**d**) AgCl_KCl sample series.

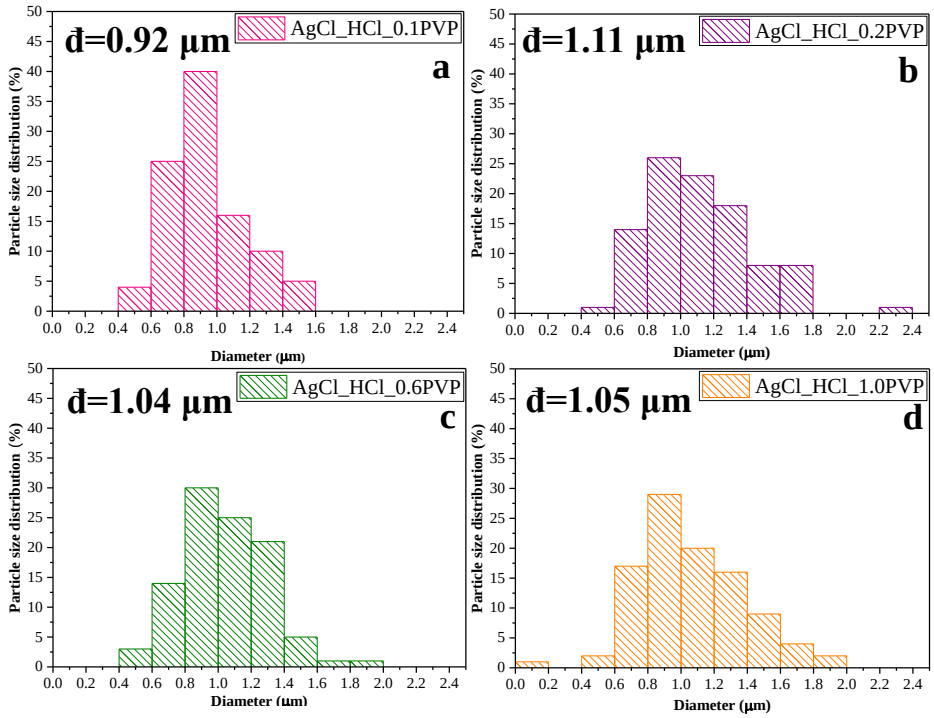

Figure S5. Particle size distribution of the samples: (**a**) AgCl_HCl_0.1PVP; (**b**) AgCl_HCl_0.2PVP; (**c**) AgCl_HCl_0.6PVP; and (**d**) AgCl_HCl_1.0PVP.

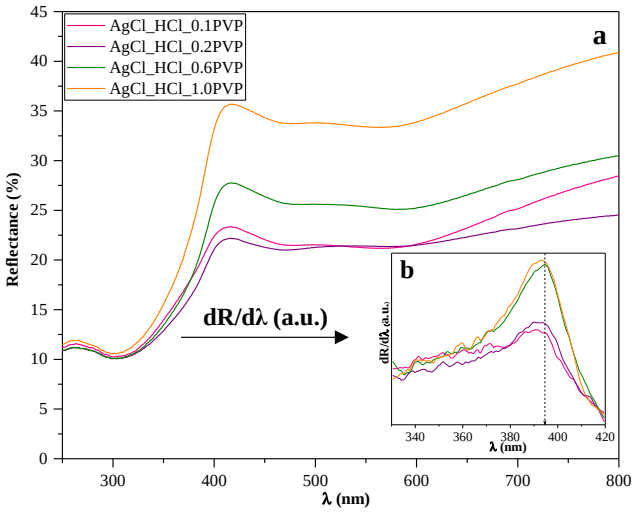

Figure S6. The effect of PVP amount on the optical properties of the catalysts: (**a**) DRS spectra; (**b**) inset graph: first-order derivative DRS spectra of the AgCl_HCl_**x**PVP samples series (**x** = 0.1, 0.2, 0.6, and 1.0 g).

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Table S1. Summary of the diffractions patterns, band gap energy value of the samples and conversion values of the degradation of MO.

	Sample	Summary of the diffraction's patterns of the samples										Band gap energy (eV)	Conversion of degradation of MO(%)
		Materials with a high percentage			Possibly covered diffraction signals			Materials with a low percentage					
		AgCl (≈27.7°)	AgCl (≈32.2°)	AgCl (≈46.2°)	1st (≈27.6°)	2nd (≈32.6°)	3rd (≈45.9°)	$AgClO_4$ (≈25.0°)	$AgClO_3$ (≈29.0°)	Ag (≈38.0°)	$AgClO_3$ [a] (≈41.4°)		
Cation effect	AgCl_HCl_NØ	x	x	x	x	x	x		x		x	2.34	0.00
	AgCl_HCl_PVP	x	x	x				x	x		x	2.41	21.7
	AgCl_HCl_SDS	x	x	x	x	x	x	x	x		x	2.67	16.4
	AgCl_NaCl_NØ	x	x	x					x		x	2.55	5.6
	AgCl_NaCl_PVP	x	x	x	x	x	x					2.38	9.3
	AgCl_NaCl_SDS	x	x	x				x	x		x	2.35	5.8
	AgCl_KCl_NØ	x	x	x	x	x	x		x	x	x	2.49	9.8
	AgCl_KCl_PVP	x	x	x				x	x	x	x	2.49	11.8
	AgCl_KCl_SDS	x	x	x				x	x	x	x	2.49	9.9
PVP amount effect	AgCl_HCl_0.1PVP	x	x	x	x	x	x		x	x	x	2.17	23.7
	AgCl_HCl_0.2PVP	x	x	x	x	x	x		x		x	2.24	24.2
	AgCl_HCl_0.6PVP	x	x	x	x	x	x					2.33	32.8
	AgCl_HCl_1.0PVP	x	x	x	x	x	x		x		x	2.63	27.6
	COD card no.	00-031-1238						00-031-1239	00-101-0506	00-001-1167	00-101-0506		

[a] not all reflections are visible in XRD patterns