

Electronic Supplementary Information (ESI)

Formation of moth-eye-like structures on silicon through in situ crystallization of a layered Mg silicate

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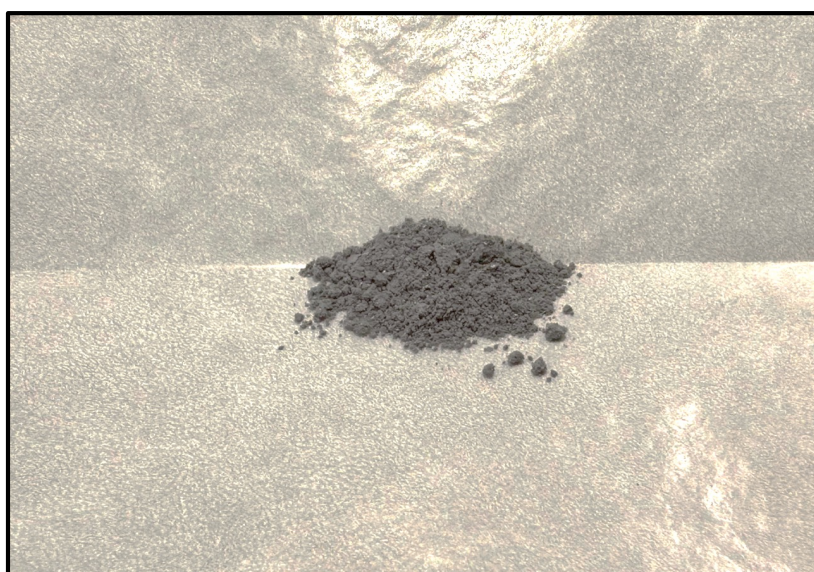
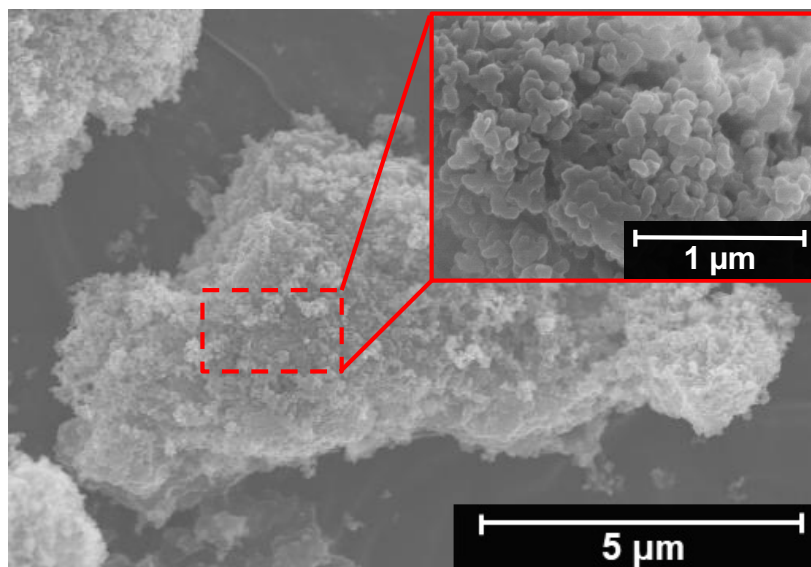


Fig. S1. SEM image and photograph of product obtained when water volume was 20 mL in the starting mixture.

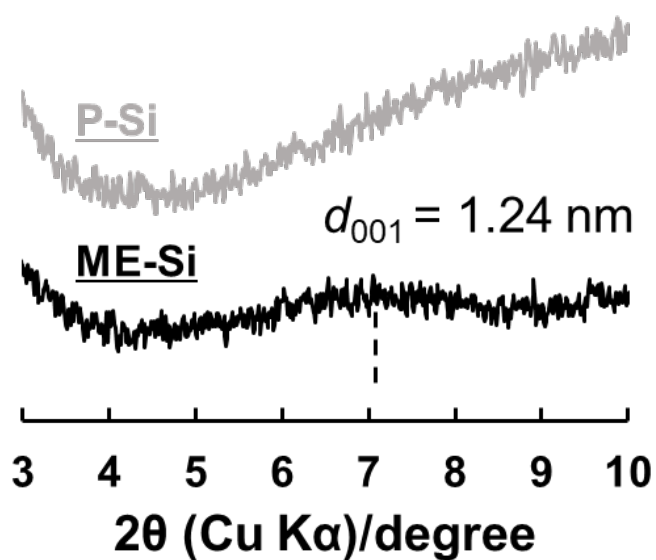
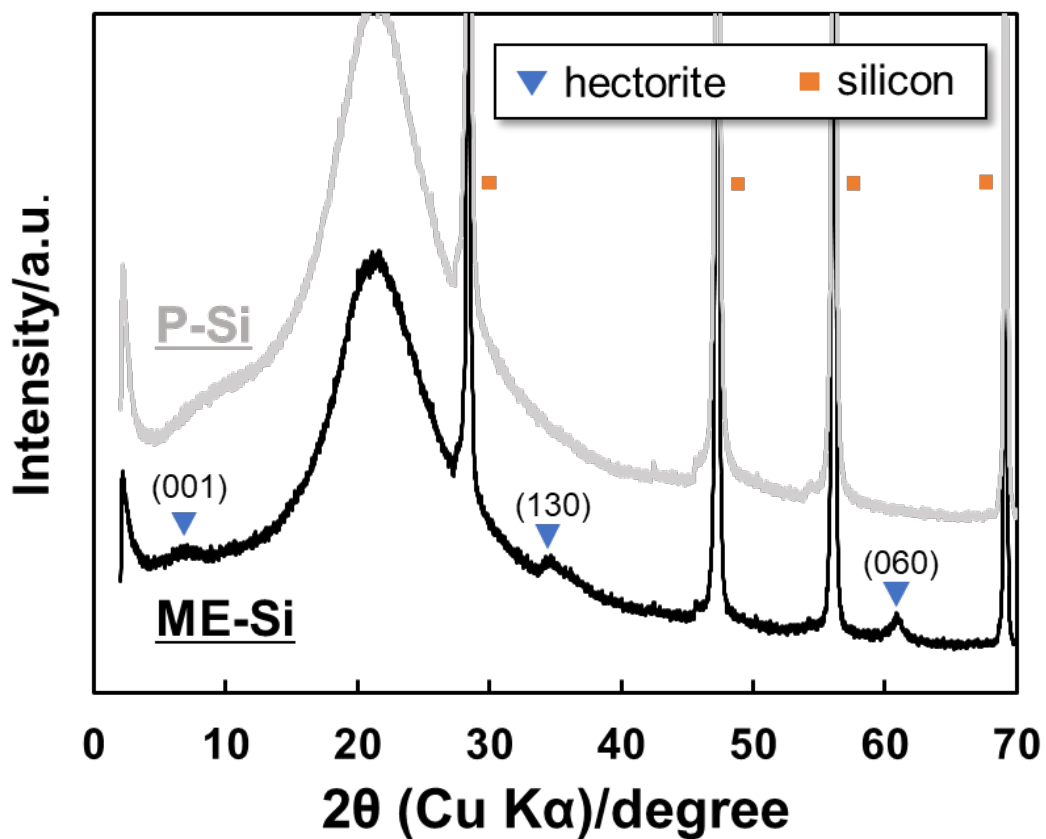


Fig. S2. XRD patterns of P-Si (gray line) and ME-Si (black line).

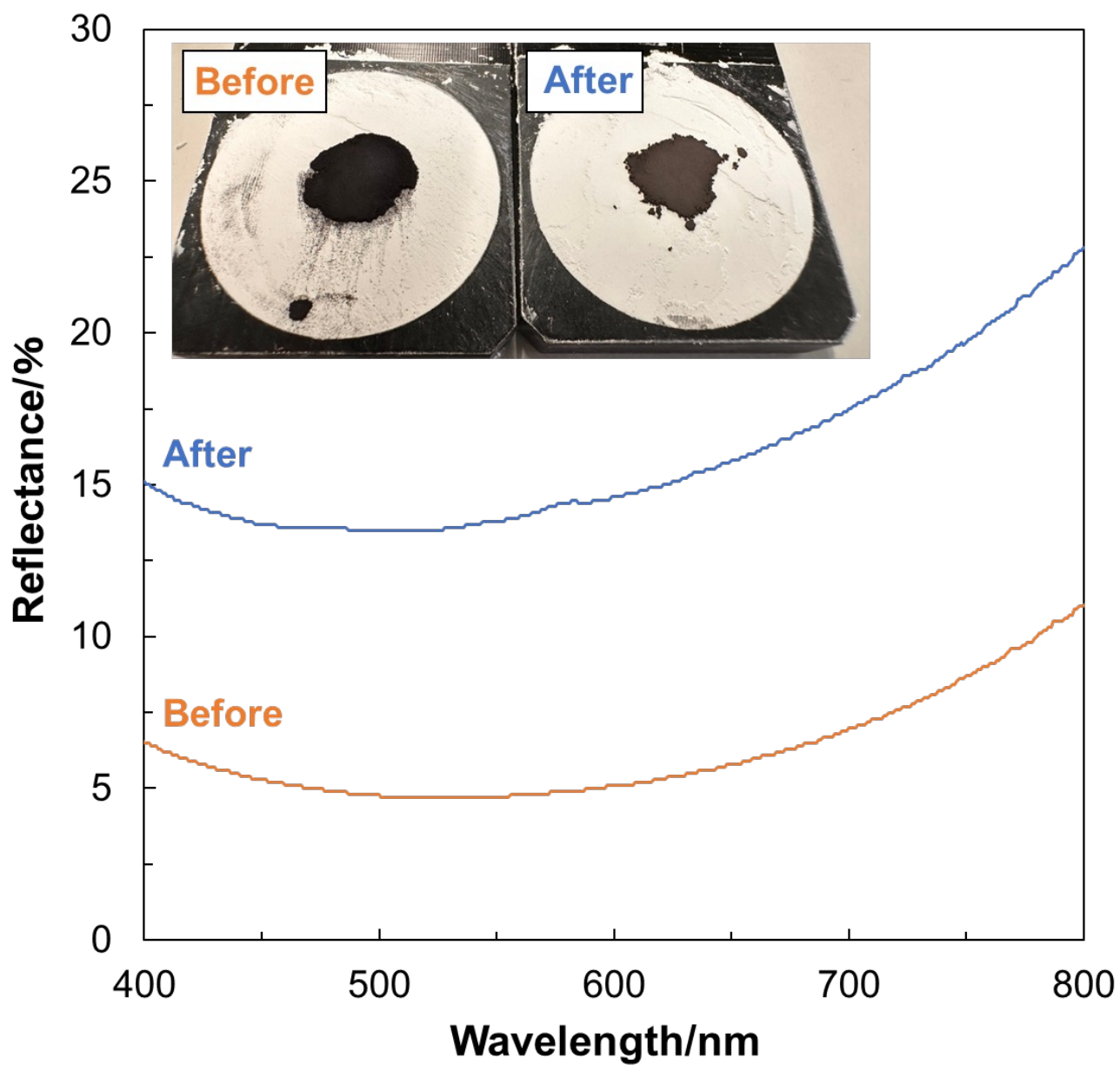


Fig. S3. Photographs and visible diffuse reflectance spectra of ME-Si and its powder after grinding.

Table S1. Experimental conditions for the *in-situ* crystallization of Mg silicate. Characterization results are shown in the corresponding figures, whose numbers are listed on the right side.

Sample	Temperature/°C	Time/h	Conc./M [Mg]	[Cl]	LiF:MgCl ₂ :Si	
ME-Si	150	48	0.12	0.24	0.07:0.27:8.0	} Figs. 1-4, Fig. S2,
ME-Si_80°C	80	48	0.12	0.24	0.07:0.27:8.0	
ME-Si_100°C	100	48	0.12	0.24	0.07:0.27:8.0	
ME-Si_120°C	120	48	0.12	0.24	0.07:0.27:8.0	
ME-Si_170°C	170	48	0.12	0.24	0.07:0.27:8.0	
ME-Si_3 h	150	3	0.12	0.24	0.07:0.27:8.0	} Fig. 6, Fig. S5,
ME-Si_6 h	150	6	0.12	0.24	0.07:0.27:8.0	
ME-Si_9 h	150	9	0.12	0.24	0.07:0.27:8.0	
ME-Si_24 h	150	24	0.12	0.24	0.07:0.27:8.0	
ME-Si_72 h	150	72	0.12	0.24	0.07:0.27:8.0	
ME-Si_3	150	48	0.36	0.72	0.21:0.8:8.0	} Figs. S6-S8
ME-Si_6	150	48	0.72	1.4	0.42:1.6:8.0	
ME-Si_9	150	48	1.1	2.2	0.63:2.4:8.0	
ME-Si_12	150	48	1.4	2.9	0.84:3.2:8.0	
ME-Si_15	150	48	1.8	3.6	1.1:4.1:8.0	
ME-Si_20	150	48	2.4	4.8	1.4:5.3:8.0	

Table S2. Color parameters and chroma ($(|a^*|^2+|b^*|^2)^{1/2}$) of products.

Sample	L^*	a^*	b^*	$(a^* ^2+ b^* ^2)^{1/2}$
ME-Si	27.5 ± 1.3	2.7	-1.1	2.9
P-Si	38.7	0.8	-2.2	2.3
ME-Si_24 h	28.7	2.8	-2.2	3.6
ME-Si_80°C	32.0	2.6	2.9	3.9
ME-Si_100°C	30.3	3.5	-0.5	3.5
ME-Si_120°C	29.7	2.9	1.0	3.1

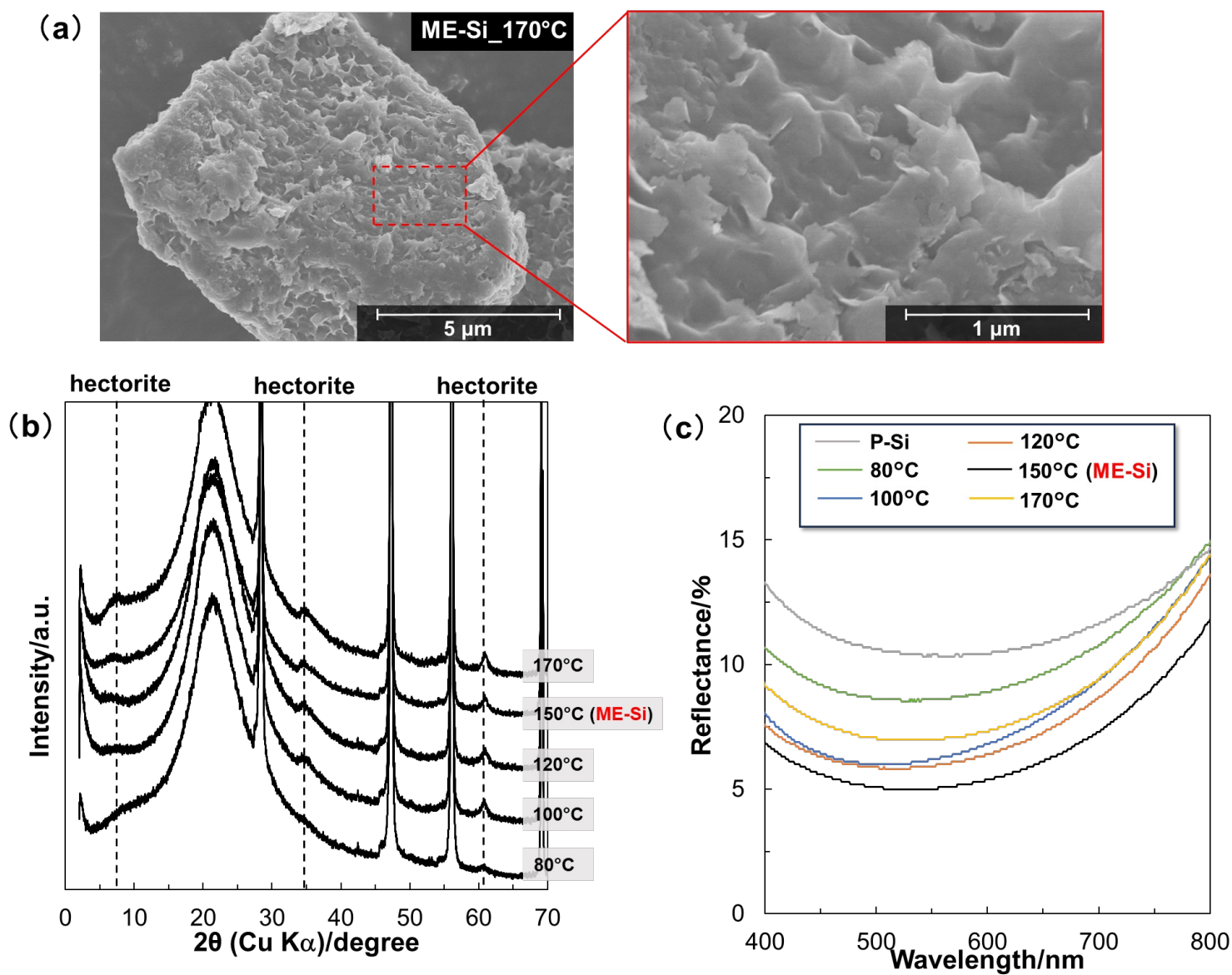


Fig. S4. SEM image of ME-Si_170°C, XRD patterns and visible diffuse reflectance spectra of the products obtained at 80°C, 100°C, 120°C, 150°C and 170°C (Fig. S4)

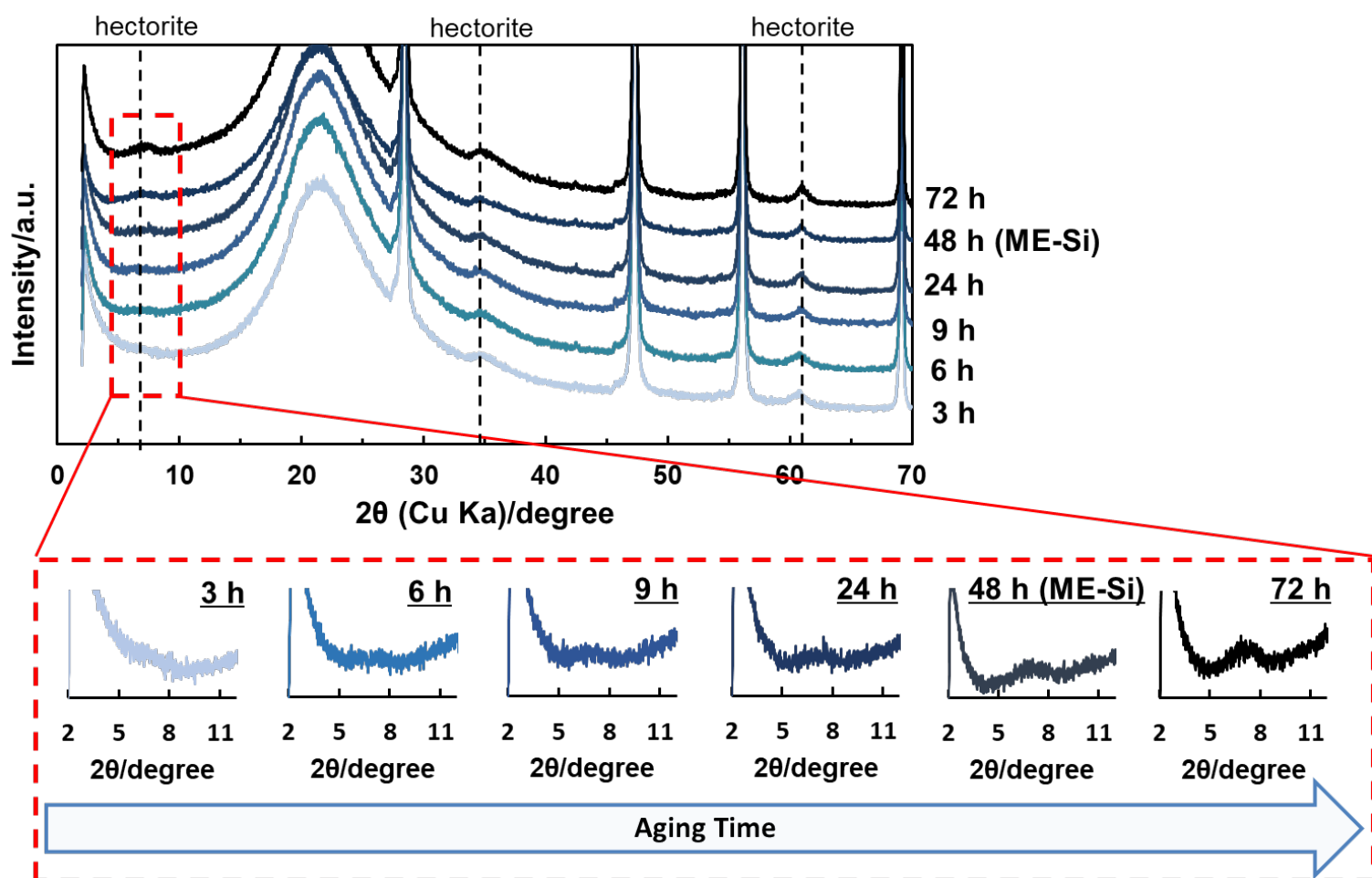


Fig. S5. XRD patterns of the product obtained via reactions at 3, 6, 9, 24, 48, and 72 h.

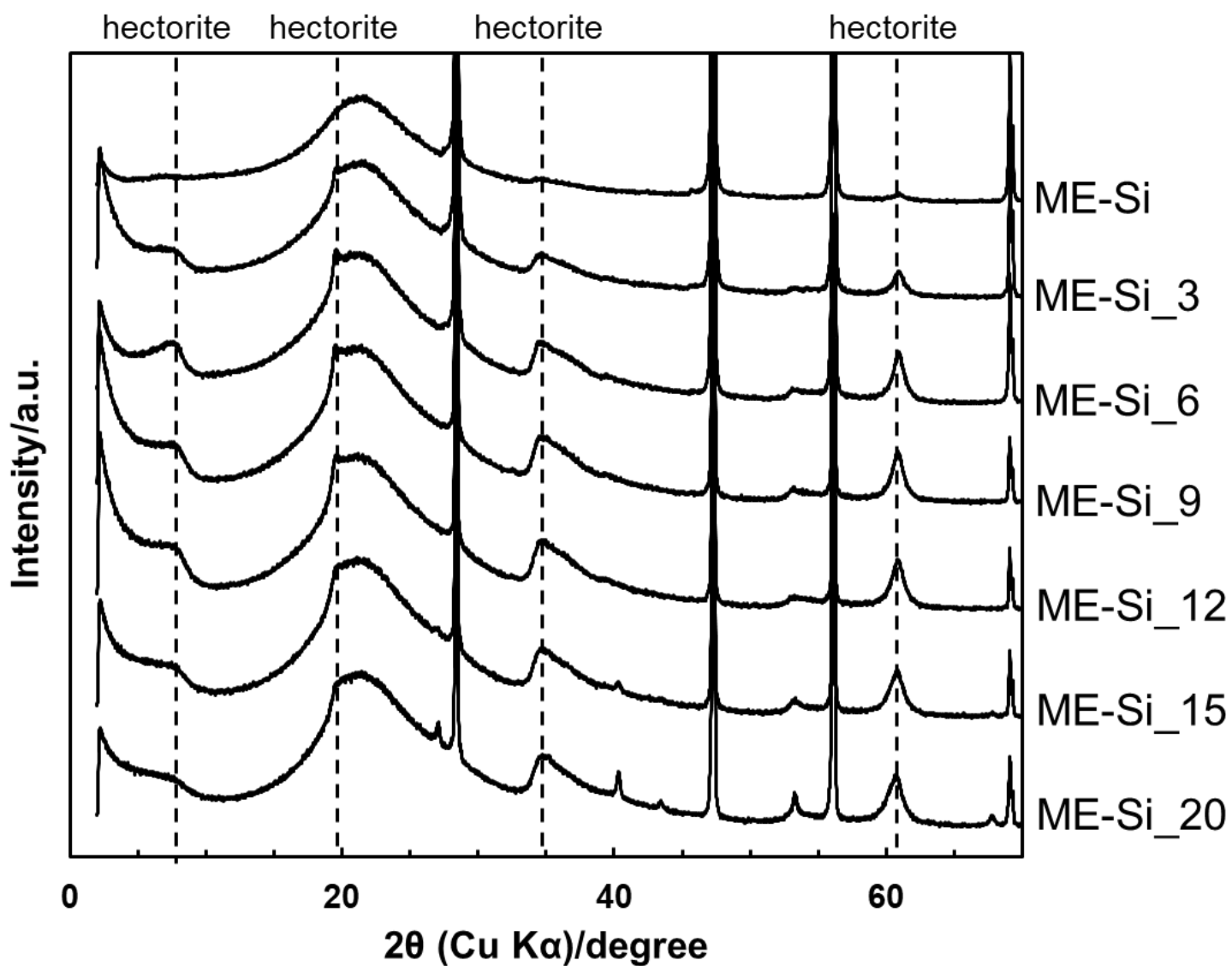


Fig. S6. XRD patterns of the products obtained with different amounts of MgCl_2 and LiF in the starting mixtures. The x in the sample name (ME-Si _{x}) denotes x -folds the amounts of MgCl_2 and LiF in the starting mixtures compared with those of ME-Si.

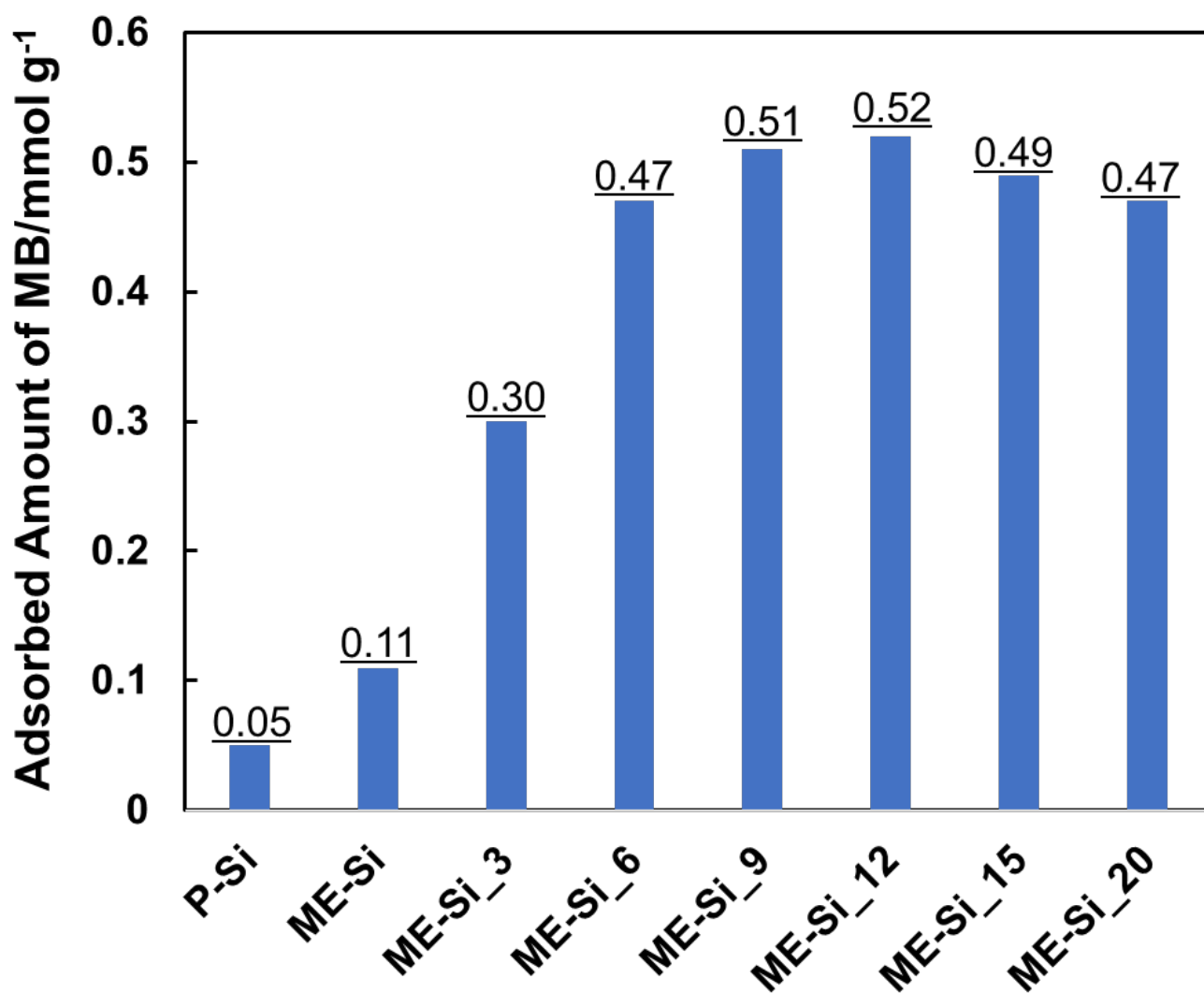


Fig. S7. Adsorbed amount of MB on products obtained from aqueous solutions at room temperature.

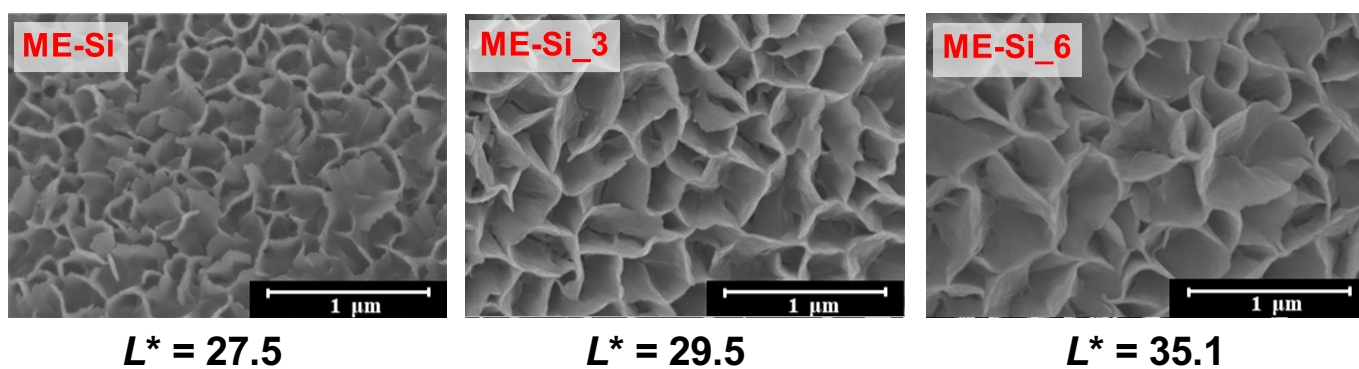


Fig. S8. SEM images of (left) ME-Si and (middle) 3-fold and (right) 6-fold higher concentrations of aqueous MgCl_2 solutions than that of ME-Si. L^* values of the products are shown at the bottom.