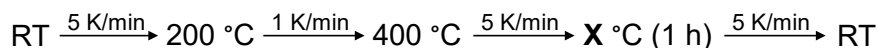
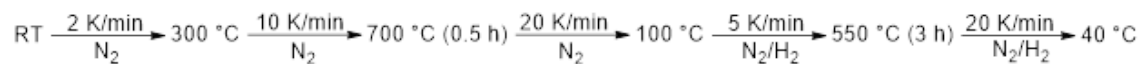


SUPPORTING INFORMATION

Additional schemes



Scheme S1: Heating program for the synthesis of NSiC_x materials at different pyrolysis temperatures X (vide infra).



Scheme S2. Heating program for the synthesis of metal loaded materials.

Additional Tables

Table S1: Sample, pyrolysis temperature X and ceramic amount of the NSiC_x materials.

Entry	Sample	Pyrolysis temperature X [°C]	Ceramic amount [%]
1	NSiC ₆₀₀	600	69
2	NSiC ₇₀₀	700	66
3	NSiC ₈₀₀	800	62
4	NSiC ₉₀₀	900	59
5	NSiC ₁₀₀₀	1000	55

Table S2. Entry, sample, metal salt, amount of metal salt and support material of the single metal loaded materials.

Entry	Sample	Metal salt	Amount of metal salt [mg]	Support material
1	Ag ₁₀₀ /NSiC ₁₀₀₀	AgNO ₃	32.8	NSiC ₁₀₀₀
2	Co ₁₀₀ /NSiC ₁₀₀₀	Co(NO ₃) ₂ • 6 H ₂ O	102.9	NSiC ₁₀₀₀
3	Mn ₁₀₀ /NSiC ₁₀₀₀	Mn(NO ₃) ₂ • 4 H ₂ O	95.2	NSiC ₁₀₀₀
4	Mn ₁₀₀ /NSiC ₆₀₀	Mn(NO ₃) ₂ • 4 H ₂ O	95.2	NSiC ₆₀₀
5	Mn ₁₀₀ /NSiC ₇₀₀	Mn(NO ₃) ₂ • 4 H ₂ O	95.2	NSiC ₇₀₀
6	Mn ₁₀₀ /NSiC ₈₀₀	Mn(NO ₃) ₂ • 4 H ₂ O	95.2	NSiC ₈₀₀
7	Mn ₁₀₀ /NSiC ₉₀₀	Mn(NO ₃) ₂ • 4 H ₂ O	95.2	NSiC ₉₀₀

Table S3. Sample, Amount of metal salt ($\text{Mn}(\text{NO}_3)_2 \cdot 4 \text{H}_2\text{O}$, AgNO_3 and $\text{Co}(\text{NO}_3)_2 \cdot 6 \text{H}_2\text{O}$) used in the synthesis of bimetal loaded materials.

Entry	Sample	Amount of metal salt [mg]		
		$\text{Mn}(\text{NO}_3)_2 \cdot 4 \text{H}_2\text{O}$	AgNO_3	$\text{Co}(\text{NO}_3)_2 \cdot 6 \text{H}_2\text{O}$
1	$\text{Mn}_{50}\text{Ag}_{50}/\text{NSiC}_{1000}$	47.6	16.4	0
2	$\text{Mn}_{50}\text{Co}_{50}/\text{NSiC}_{1000}$	47.6	0	51.5
3	$\text{Mn}_{75}\text{Ag}_{25}/\text{NSiC}_{1000}$	71.4	8.2	0
4	$\text{Mn}_{25}\text{Ag}_{75}/\text{NSiC}_{1000}$	23.8	24.6	0

Table S4. Elemental analysis for Mn-Co and Mn-Ag mixed metal catalysts.

Entry	Sample	Amount of metal present [wt%]		
		Mn [wt%]	Co [wt%]	Ag [wt%]
1	$\text{Mn}_{100}/\text{NSiC}-1000$	4.02	0	0
2	$\text{Mn}_{50}\text{Co}_{50}/\text{NSiC}-1000$	2.12	2.05	0
3	$\text{Mn}_{50}\text{Ag}_{50}/\text{NSiC}-1000$	2.07	0	1.99

Table S5. Elemental analysis for Ag-Mn mixed metal catalysts.

Entry	Sample	Amount of metal present [wt%]	
		Mn [wt%]	Ag [wt%]
1	$\text{Ag}_{100}/\text{NSiC}$	0.00	3.99
2	$\text{Mn}_{75}\text{Ag}_{25}/\text{NSiC}$	2.94	1.09
3	$\text{Mn}_{50}\text{Ag}_{50}/\text{NSiC}$	2.07	1.99
4	$\text{Mn}_{25}\text{Ag}_{75}/\text{NSiC}$	1.04	3.07
5	$\text{Mn}_{100}/\text{NSiC}$	4.02	0.00

Additional Equations

$$\%H_2O_2 = \frac{2 \cdot \frac{i_{ring}}{N}}{i_{disk} + \frac{i_{ring}}{N}} \times 100 \quad (S1)$$

Additional figures

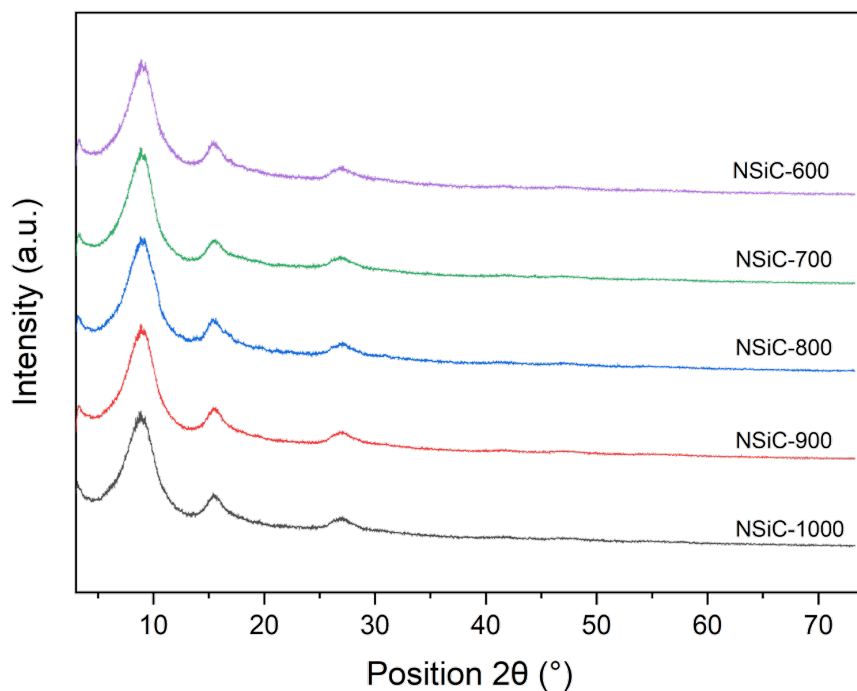


Figure S1. X-ray diffractogram of pristine NSiC-*T*, where *T* = 600, 700, 800, 900, and 1000 °C.

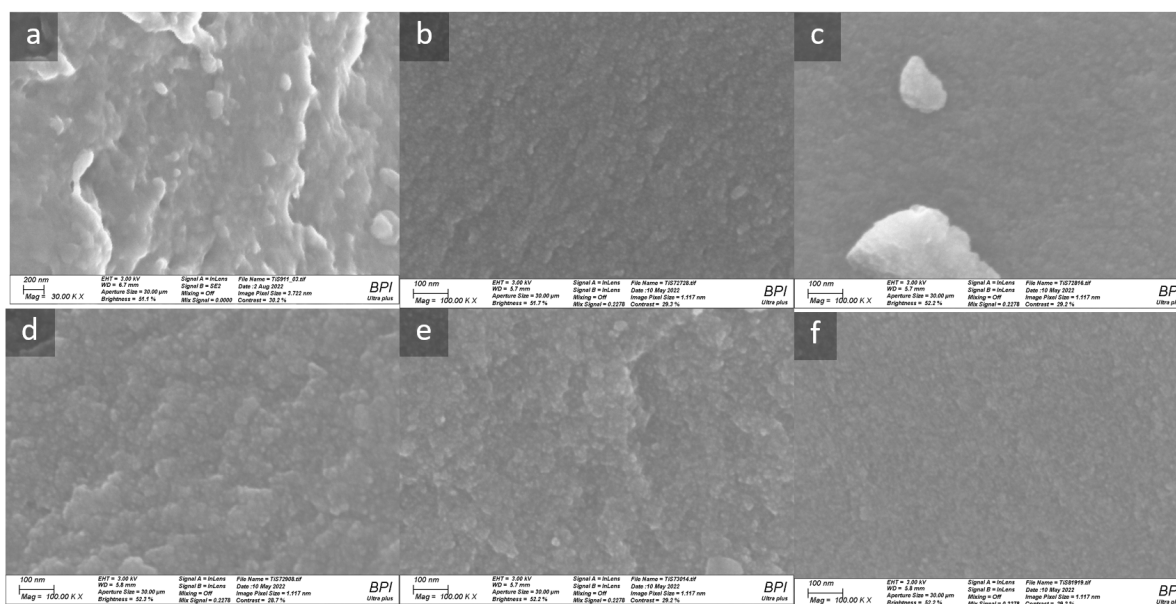


Figure S2. HRSEM images of NSiC-*T* precursor (a) and NSiC-*T* materials (b-f) at increasing pyrolysis temperatures (*T*): (b) 600 °C, (c) 700 °C, (d) 800 °C, (e) 900 °C, (f) 1000 °C.

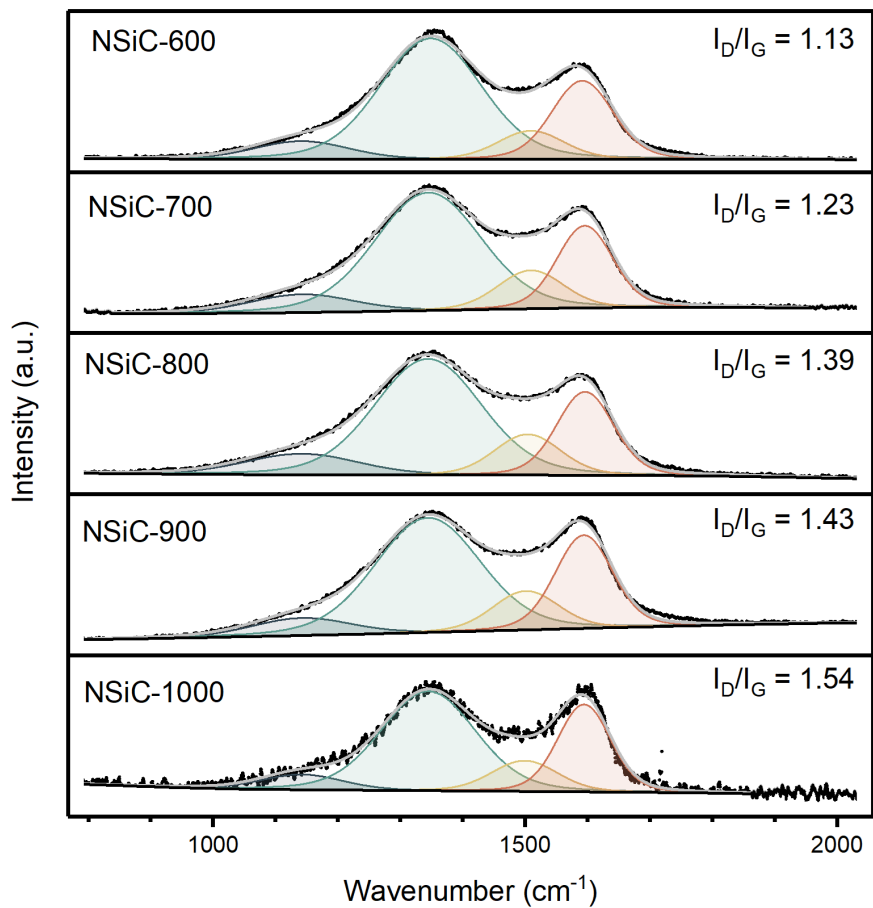


Figure S3. Raman data of NSiC-*T* materials at different pyrolysis temperatures.

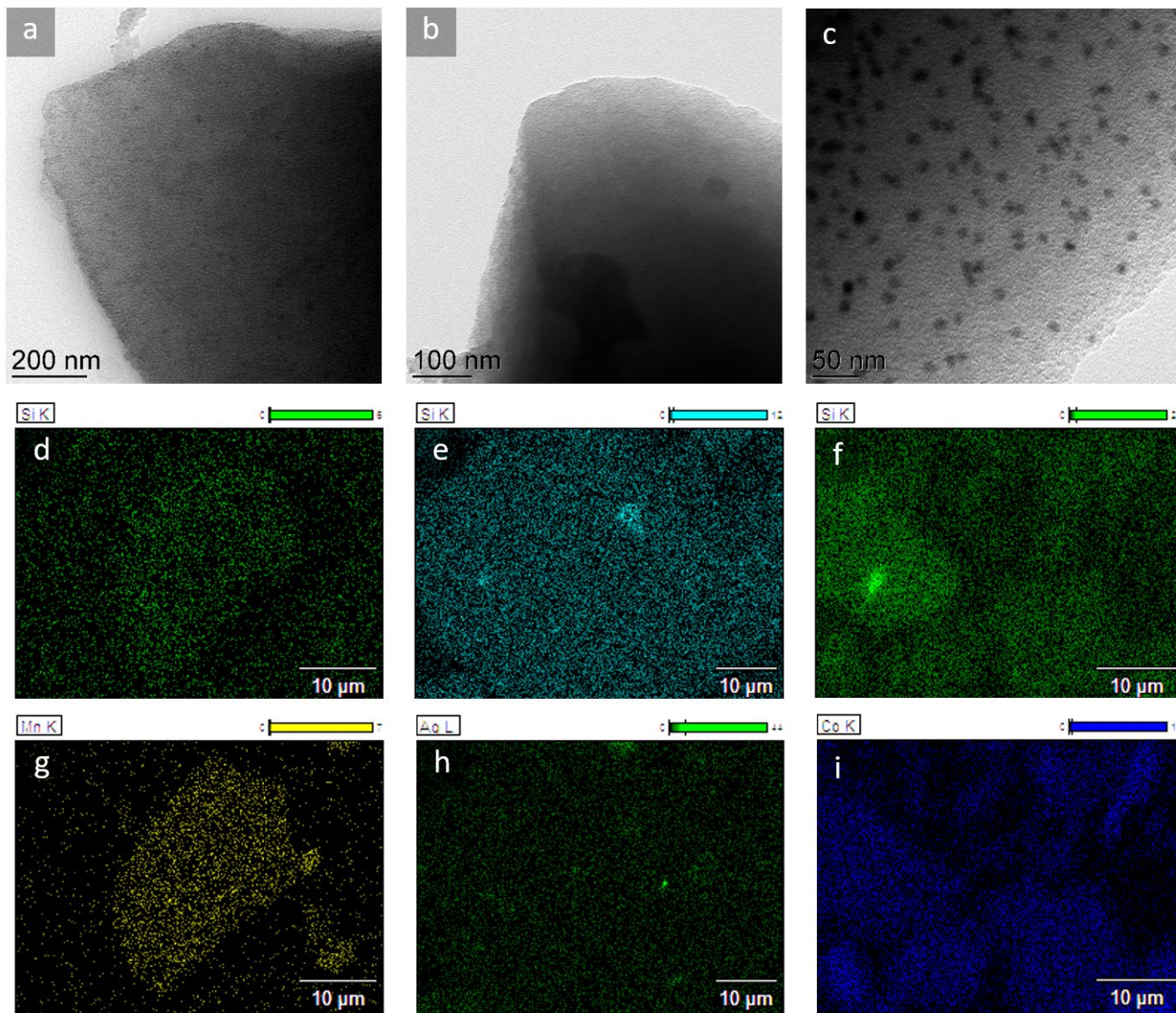


Figure S4. (a-c) TEM images of Mn, Ag and Co impregnated NSiC-T materials. (d-f) STEM-EDS elemental mapping of silicon and (g-i) the impregnated metals (Mn, Ag and Co, respectively)

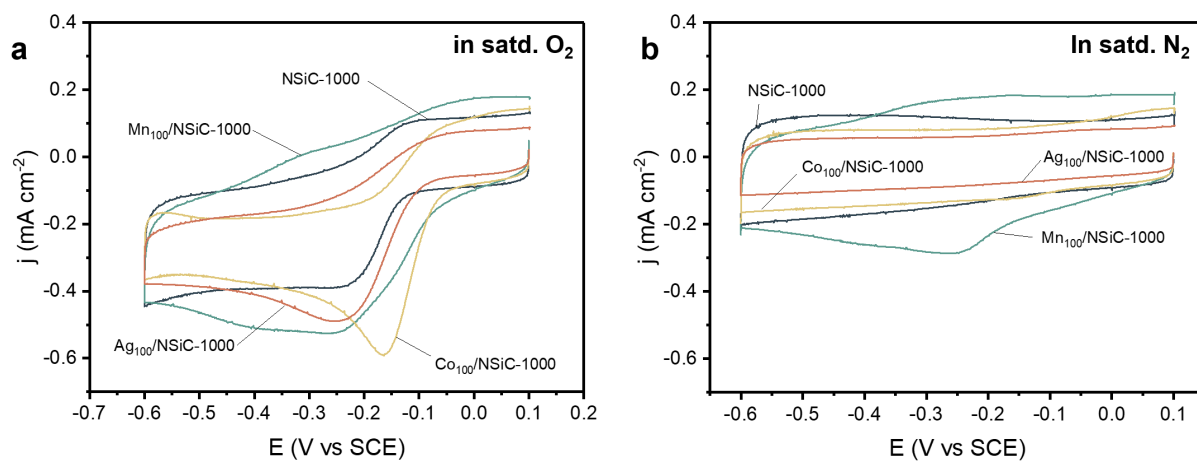


Figure S5. Cyclic voltammogram for Mn, Co and Ag impregnated NSiC-1000 materials (a) in O₂ saturated electrolyte and (b) in N₂ electrolyte.

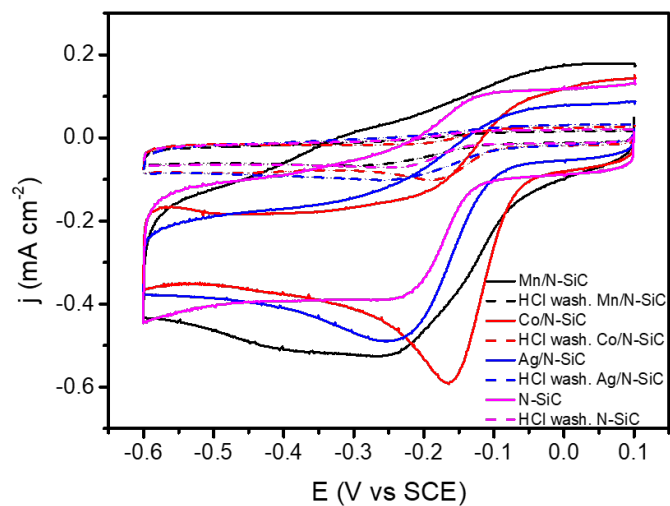


Figure S6. Cyclic voltammogram before and after washing of the Mn, Co and Ag impregnated NSiC-1000 materials.

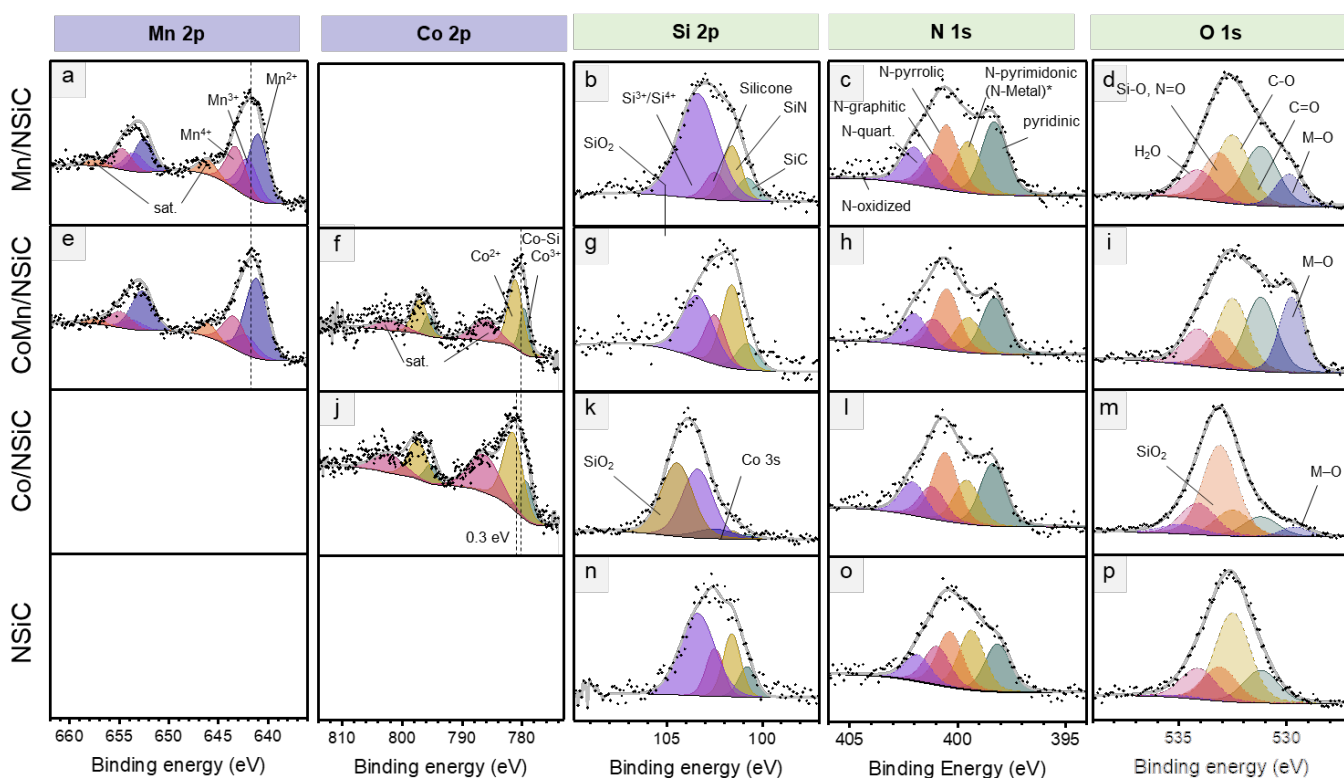


Figure S7. XPS data for Co, Co-Mn, Mn on NSiC, and on pristine NSiC materials.

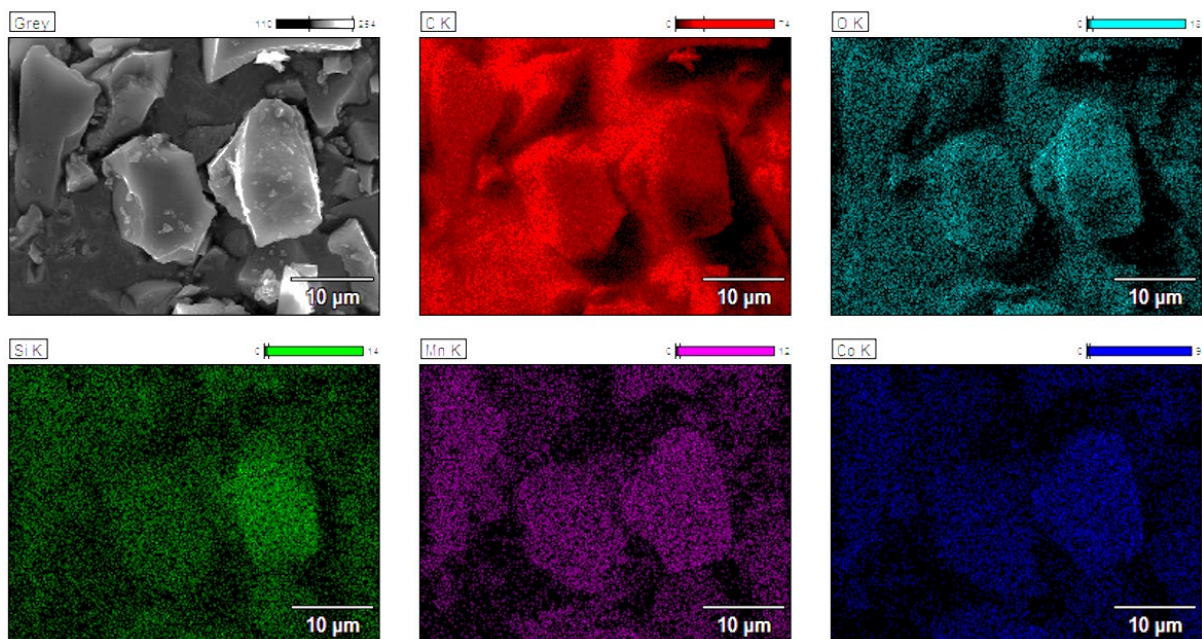


Figure S8. HAADF-STEM image of Mn-Co/NSiC-1000 with (a) a secondary electron image, and (b-f) elemental mapping images of C, O, Si, Mn and Co.

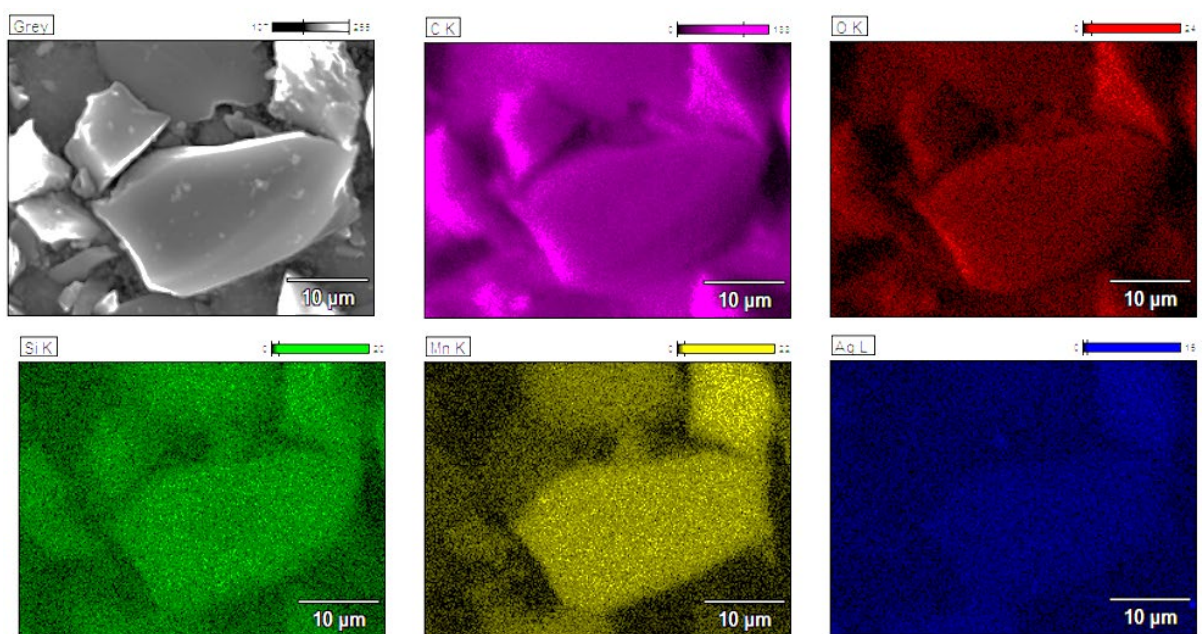


Figure S9. HAADF-STEM image of Mn-Ag/NSiC-1000 with (a) a secondary electron image, and (b-f) elemental mapping images of C, O, Si, Mn and Ag.

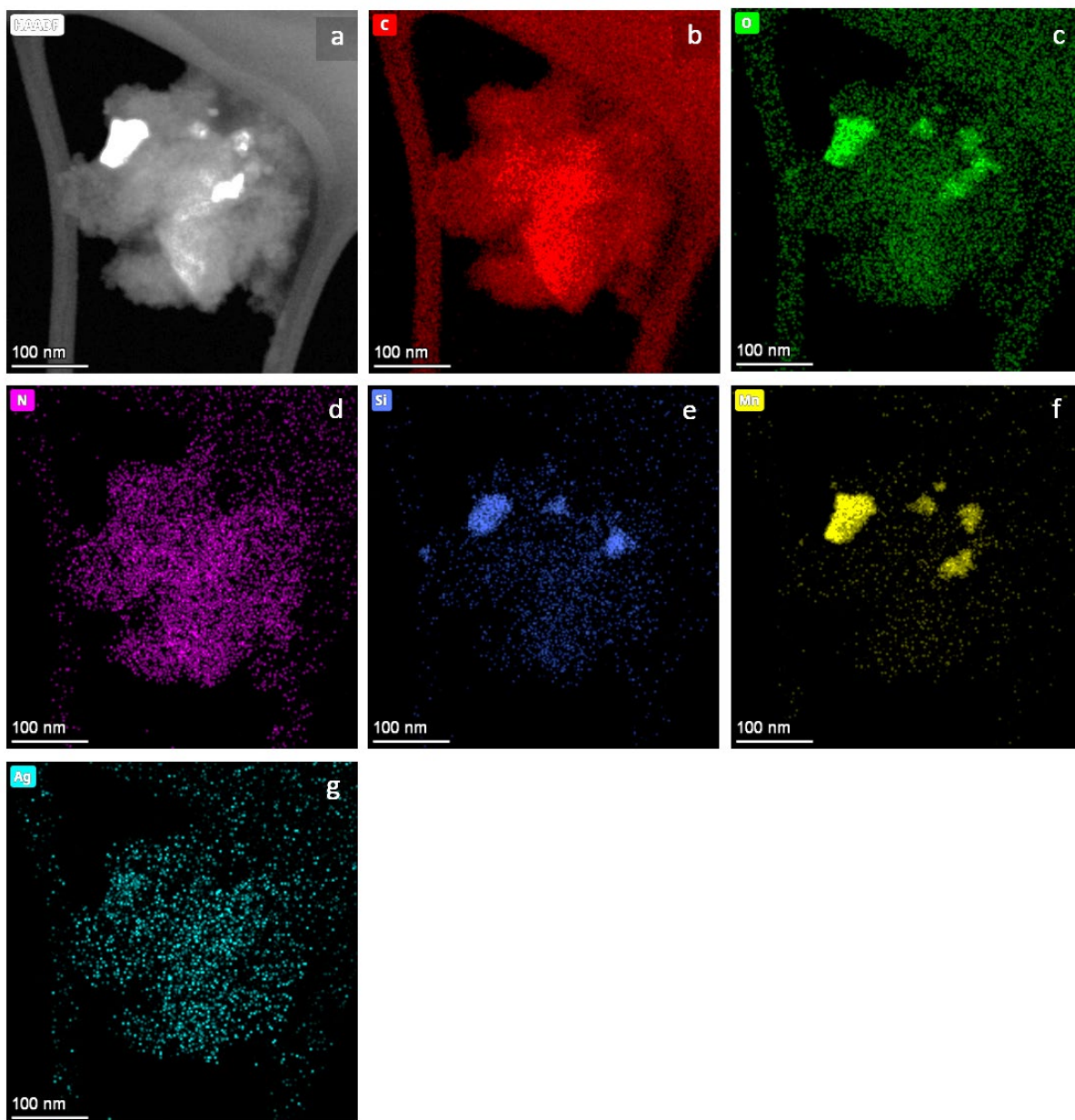


Figure S10. HAADF-STEM image of Mn₂₅Ag₇₅/NSiC-1000 with (a) a secondary electron image, and (b-g) elemental mapping images of C, O, N, Si, Mn and Ag, respectively.

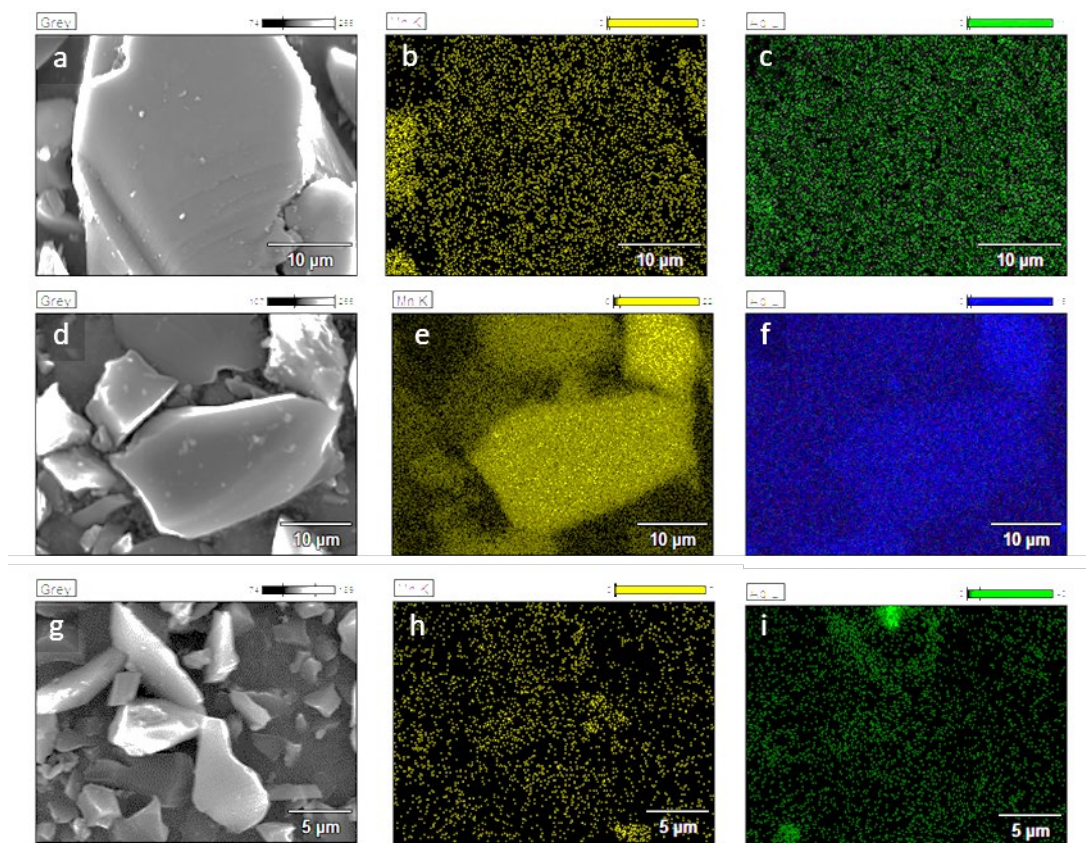


Figure S11. HAADF-STEM image of MnAg-impregnated NSiC-1000. Mn:Ag ratio was 3:1 (a), 1:1 (d) and 3:1 (g), respectively, followed by elemental mapping for Mn K-line and Ag L-line from the X-ray EDS signal (b/c, e/f, h/i for Mn:Ag ratios 3:1, 1:1 and 3:1, respectively). Micrographs a,d,g are based on the secondary electron detector.