Valorizing the Unexplored Filtration Waste of Brewing Industry for Green Silver Nanocomposite Synthesis

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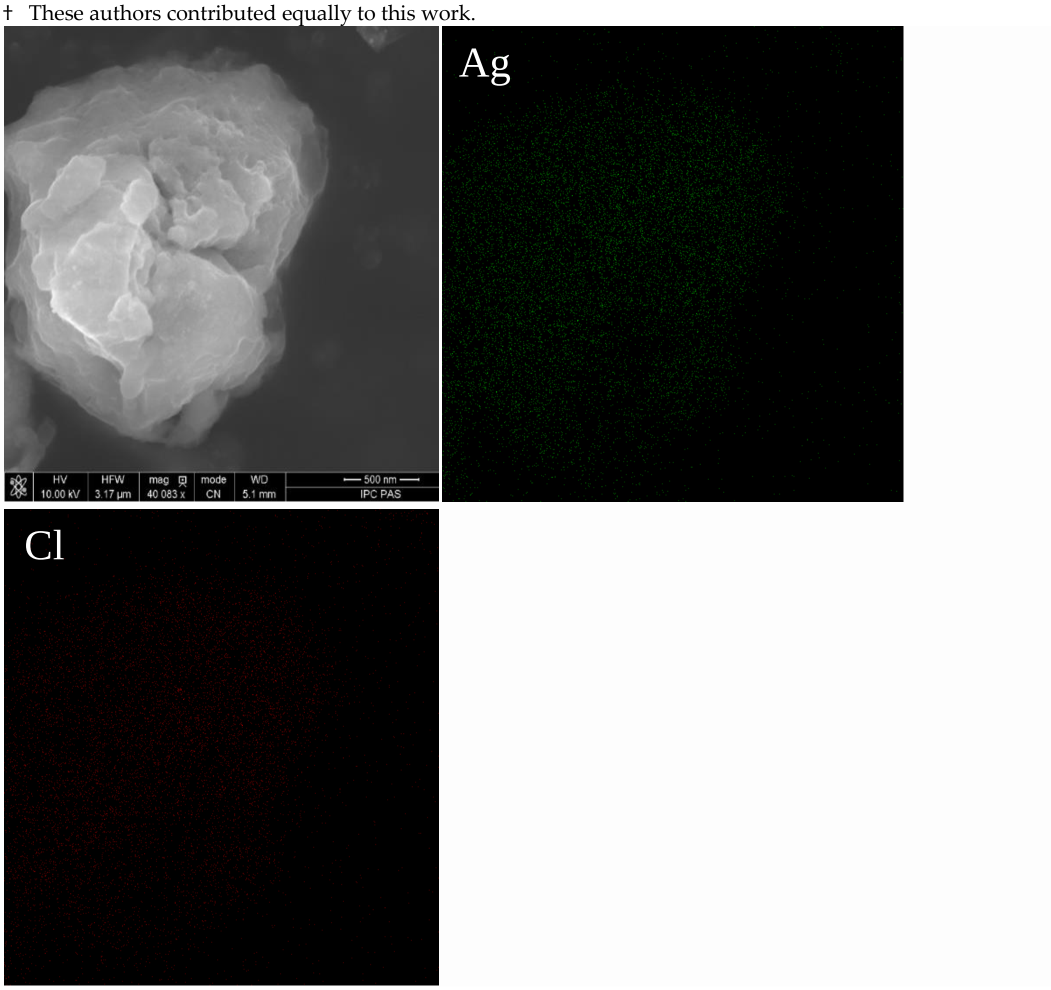


Figure S1a. Elemental mapping of BW9Ag1 nanocomposite.

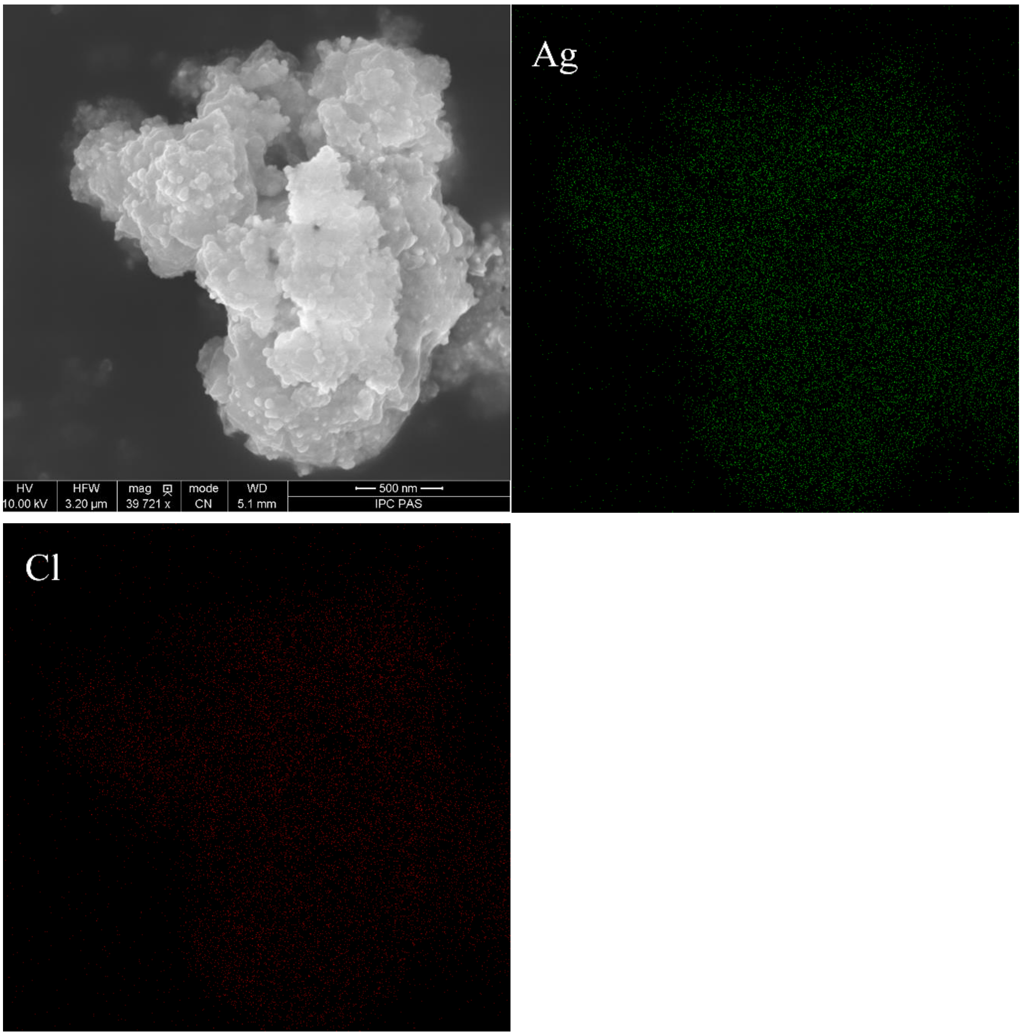


Figure S1b. Elemental mapping of BW9Ag3 nanocomposite.

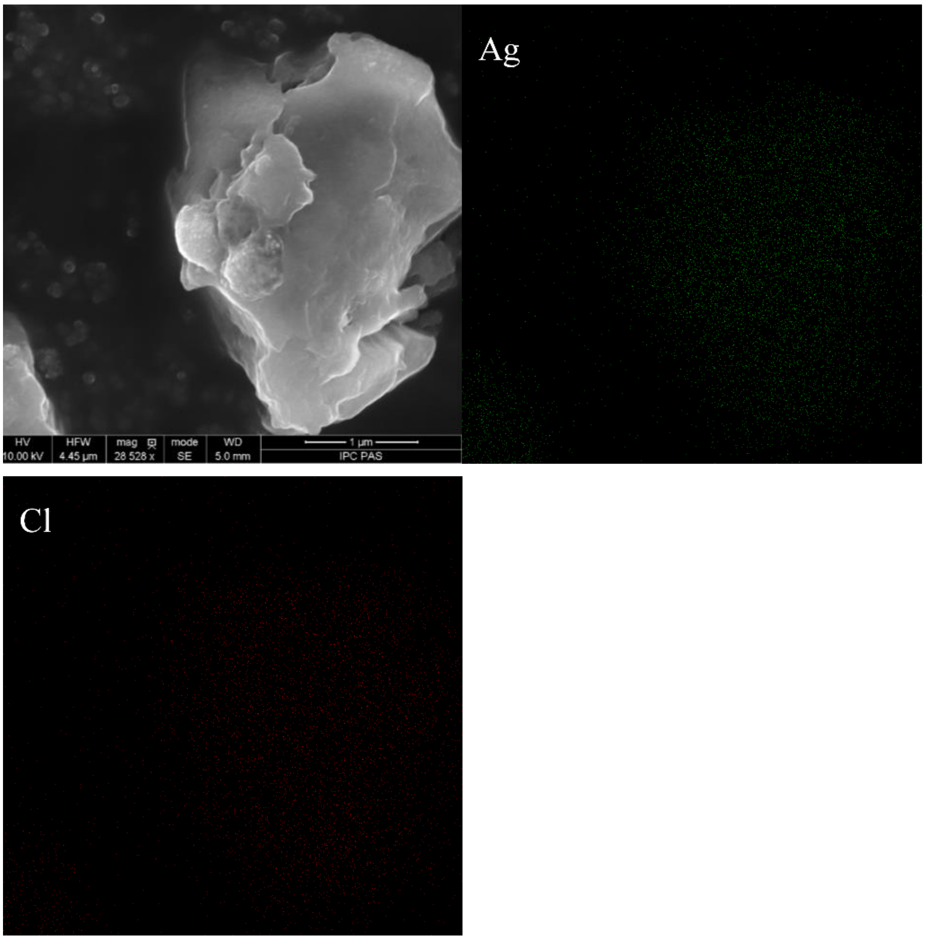


Figure S1c. Elemental mapping of BAg1 nanocomposite.

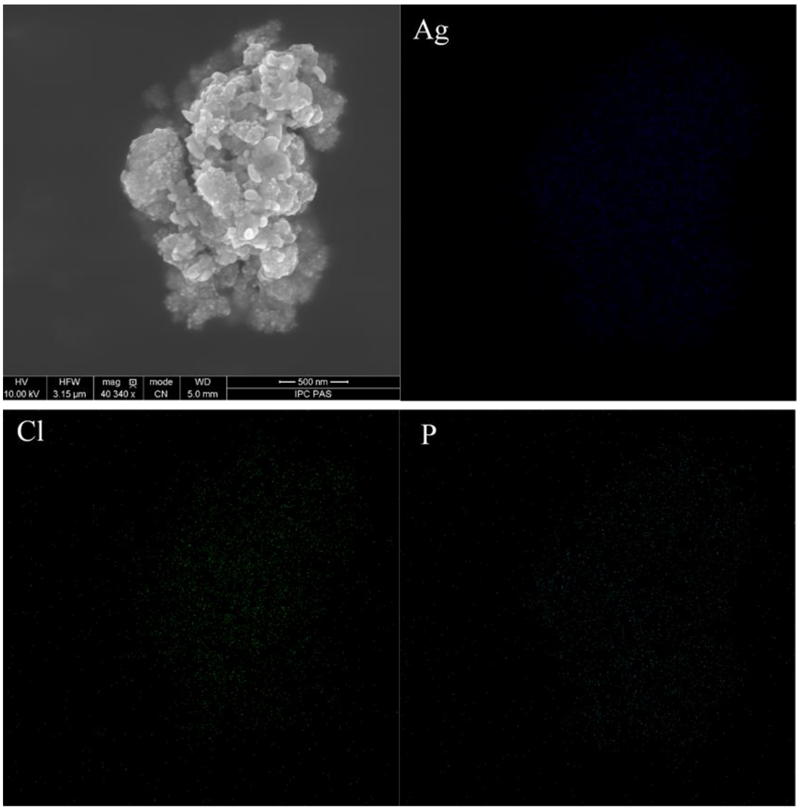


Figure S1d. Elemental mapping of BAg3 nanocomposite.

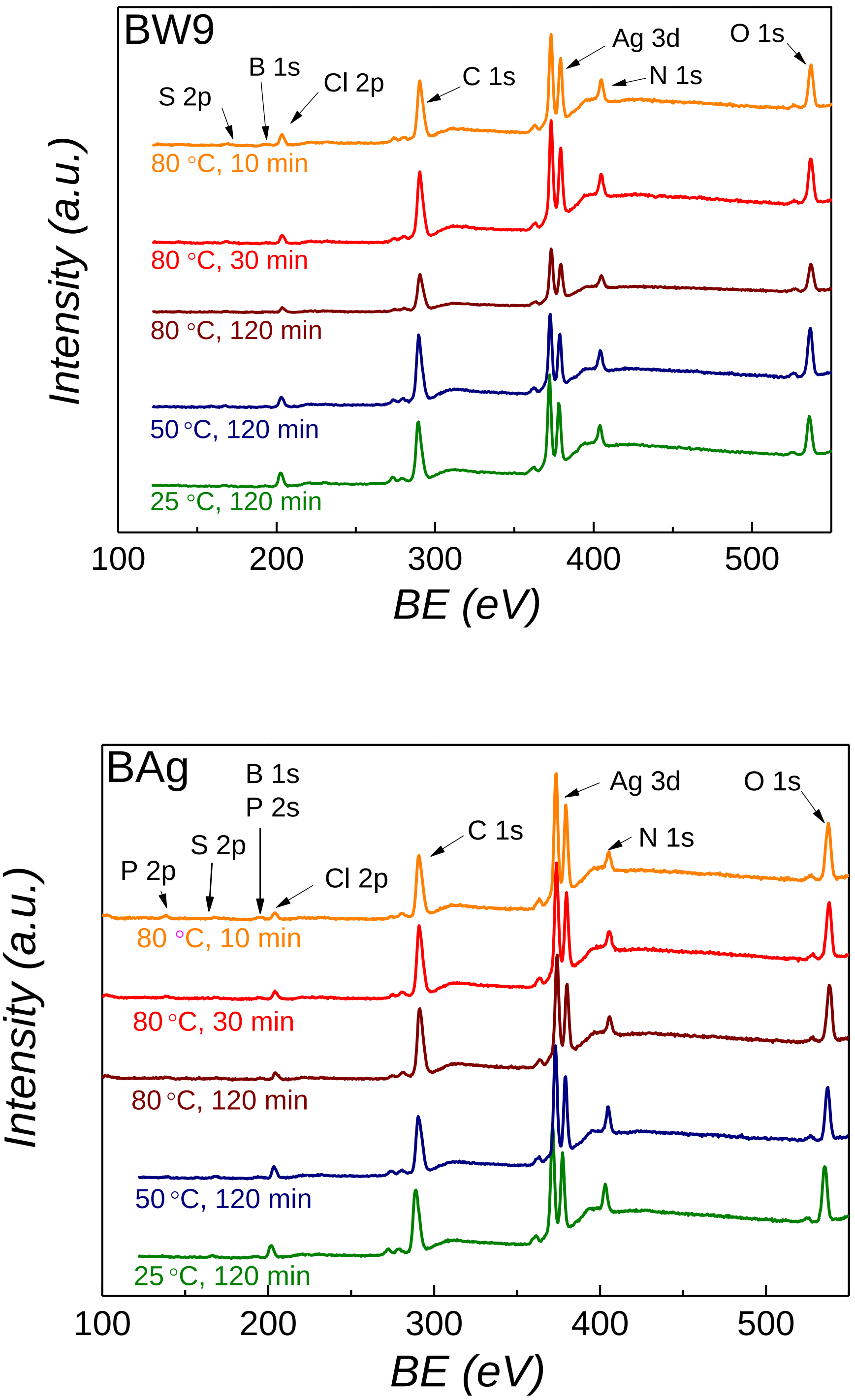


Figure S2. The XPS survey spectra of BW9 and B nanocomposites synthesized at different temperatures and times.

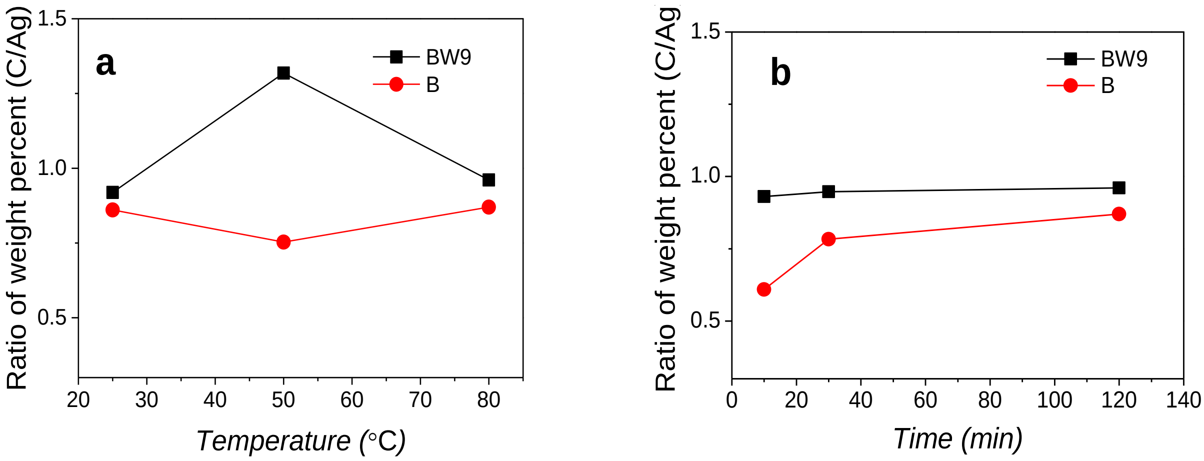


Figure S3a. C to Ag weight ratio variation for BW9 and B nanocomposites with synthesis (a) temperature and (b) time at 80 °C.

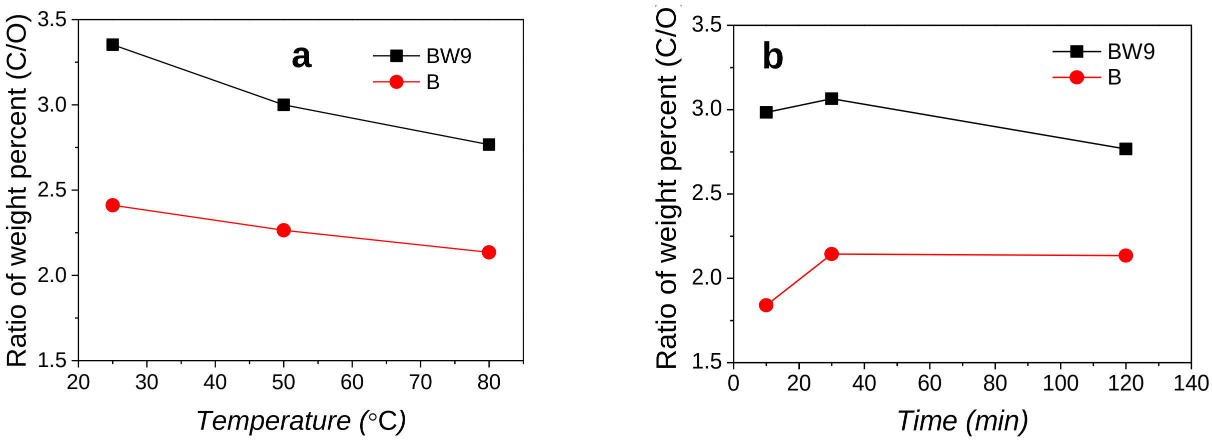


Figure S3b. C to O weight ratio variation for BW9 and B nanocomposites with synthesis (a) temperature and (b) time at 80 °C.

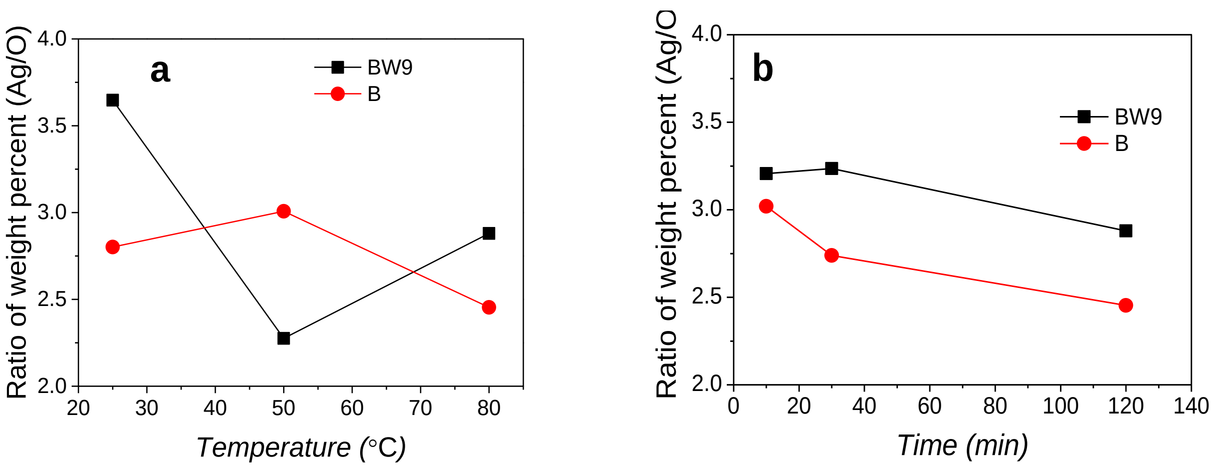


Figure S3c. Ag to O weight ratio variation for BW9 and B nanocomposites with synthesis (a) temperature and (b) time at 80 °C.

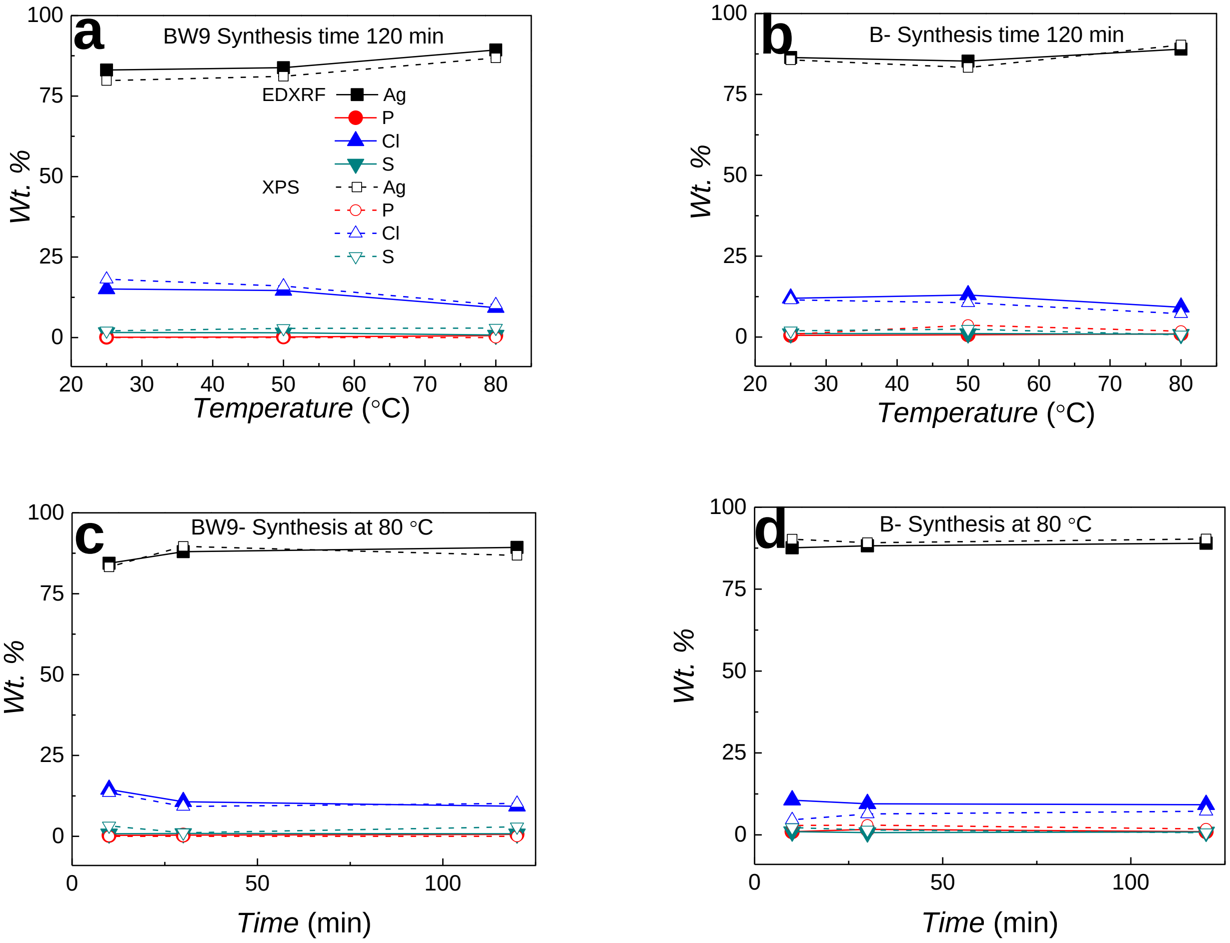
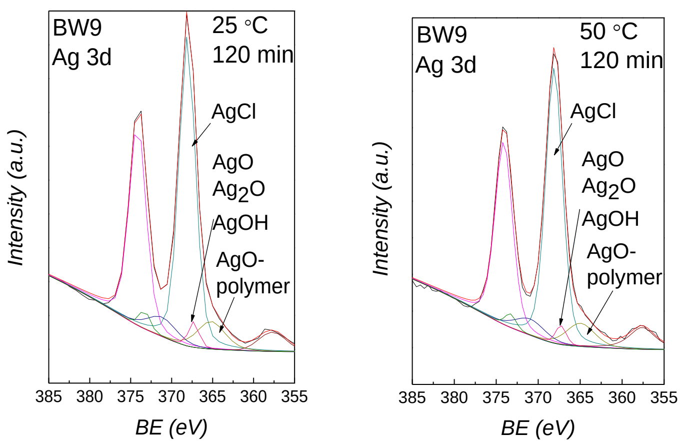


Figure S4. Elementary weight composition comparison resulting from EDXRF and XPS spectra of nanomaterials synthesized at different temperatures and times using (**a**,**c**) brewery waste BW9 and (**b**,**d**) product B.



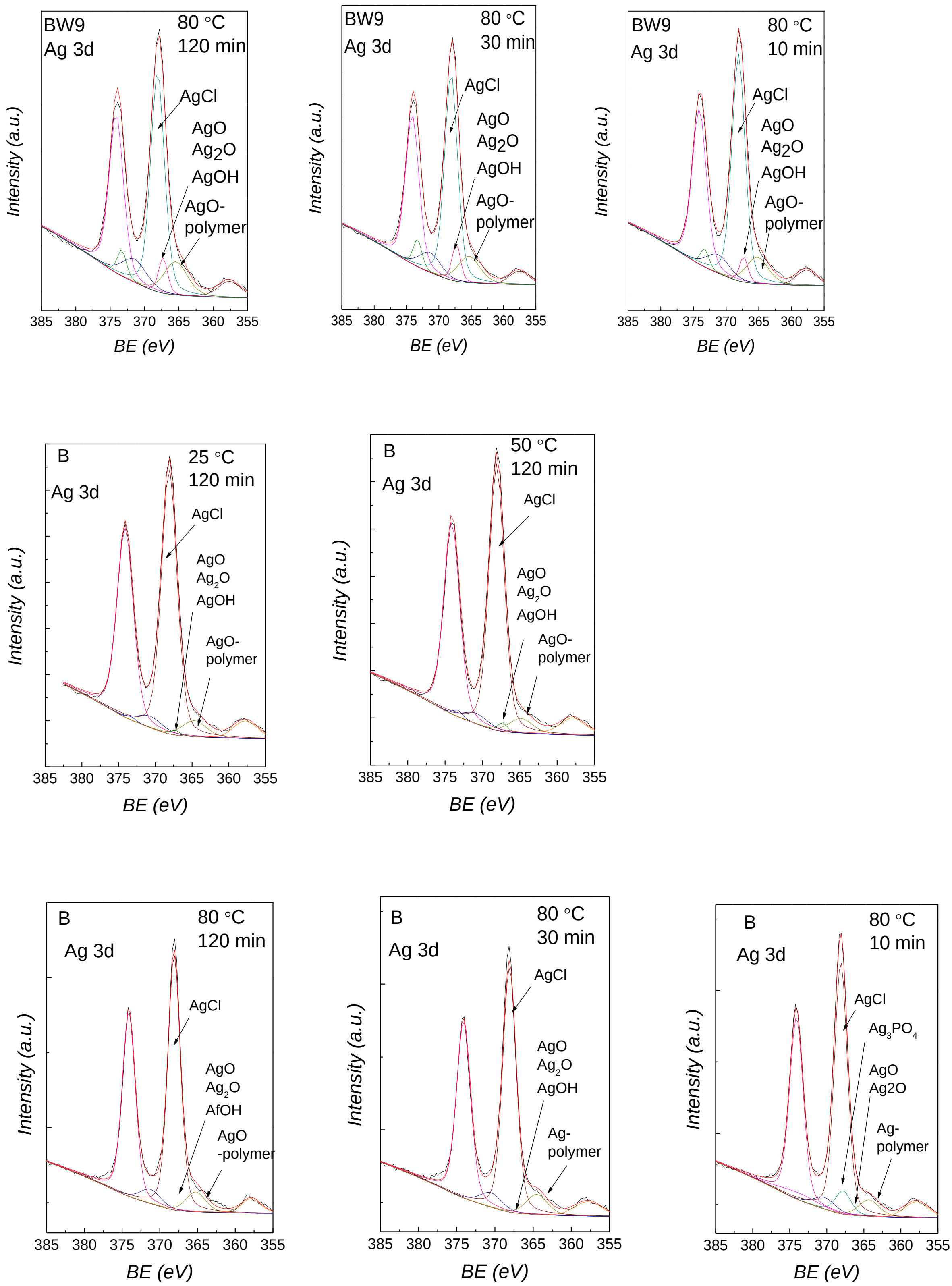
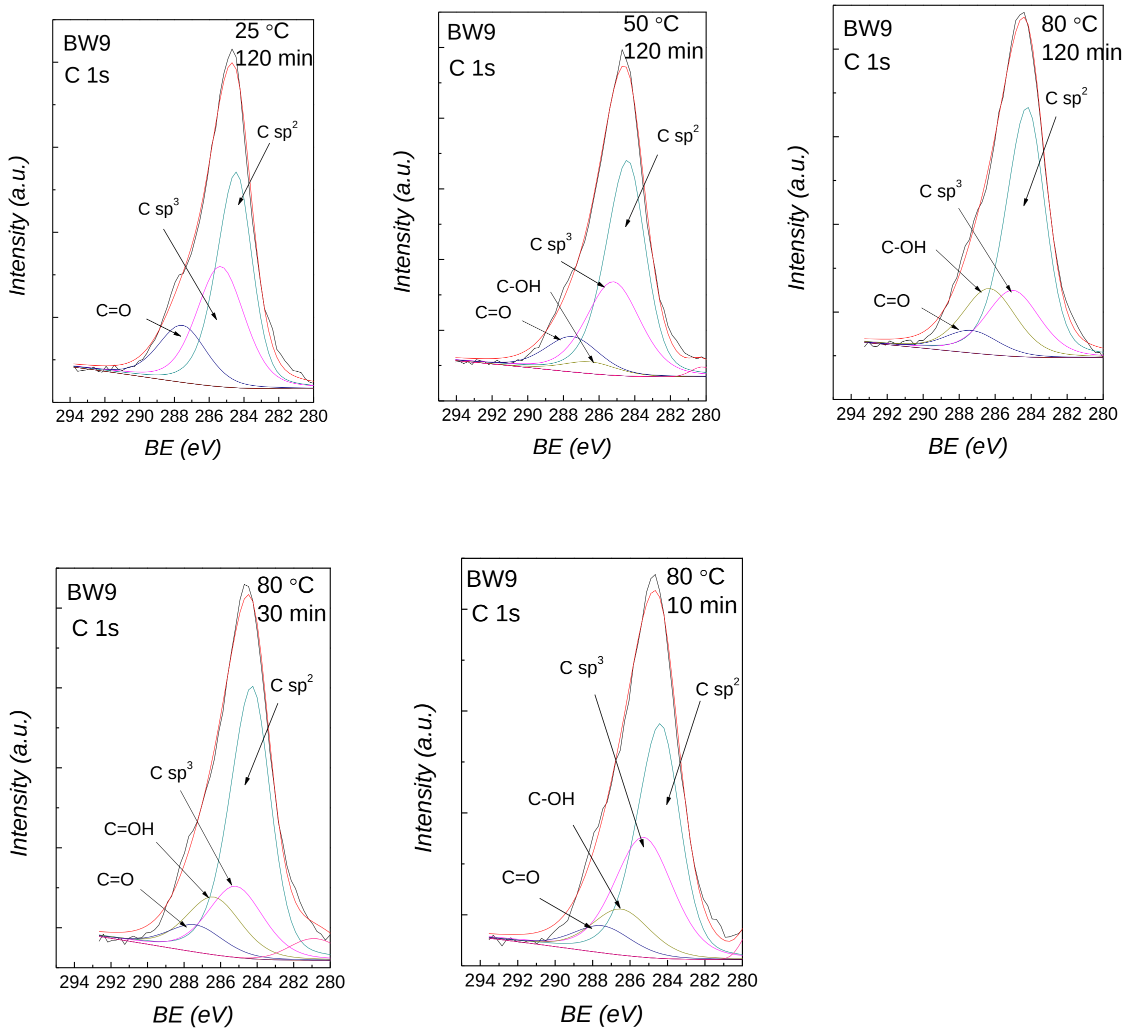


Figure S5a. The Gaussian–Lorentzian asymmetric functions to different atomic chemical states fitted Ag 3d5/2–3/2 XPS spectra recorded from BW9 and B nanocomposites synthesized at different temperatures and times.



BW9
C 1s
25 °C
120 min
C sp^2
C sp^3
C=O
Intensity (a.u.)
294 292 290 288 286 284 282 280
BE (eV)
BW9
C 1s
50 °C
120 min
C sp^2
C sp^3
C-OH
C=O
Intensity (a.u.)
294 292 290 288 286 284 282 280
BE (eV)
BW9
C 1s
80 °C
120 min
C sp^2
C sp^3
C-OH
C=O
Intensity (a.u.)
294 292 290 288 286 284 282 280
BE (eV)
BW9
C 1s
80 °C
30 min
C sp^2
C sp^3
C=OH
C=O
Intensity (a.u.)
294 292 290 288 286 284 282 280
BE (eV)
BW9
C 1s
80 °C
10 min
C sp^3
C sp^2
C-OH
C=O
Intensity (a.u.)
294 292 290 288 286 284 282 280
BE (eV)

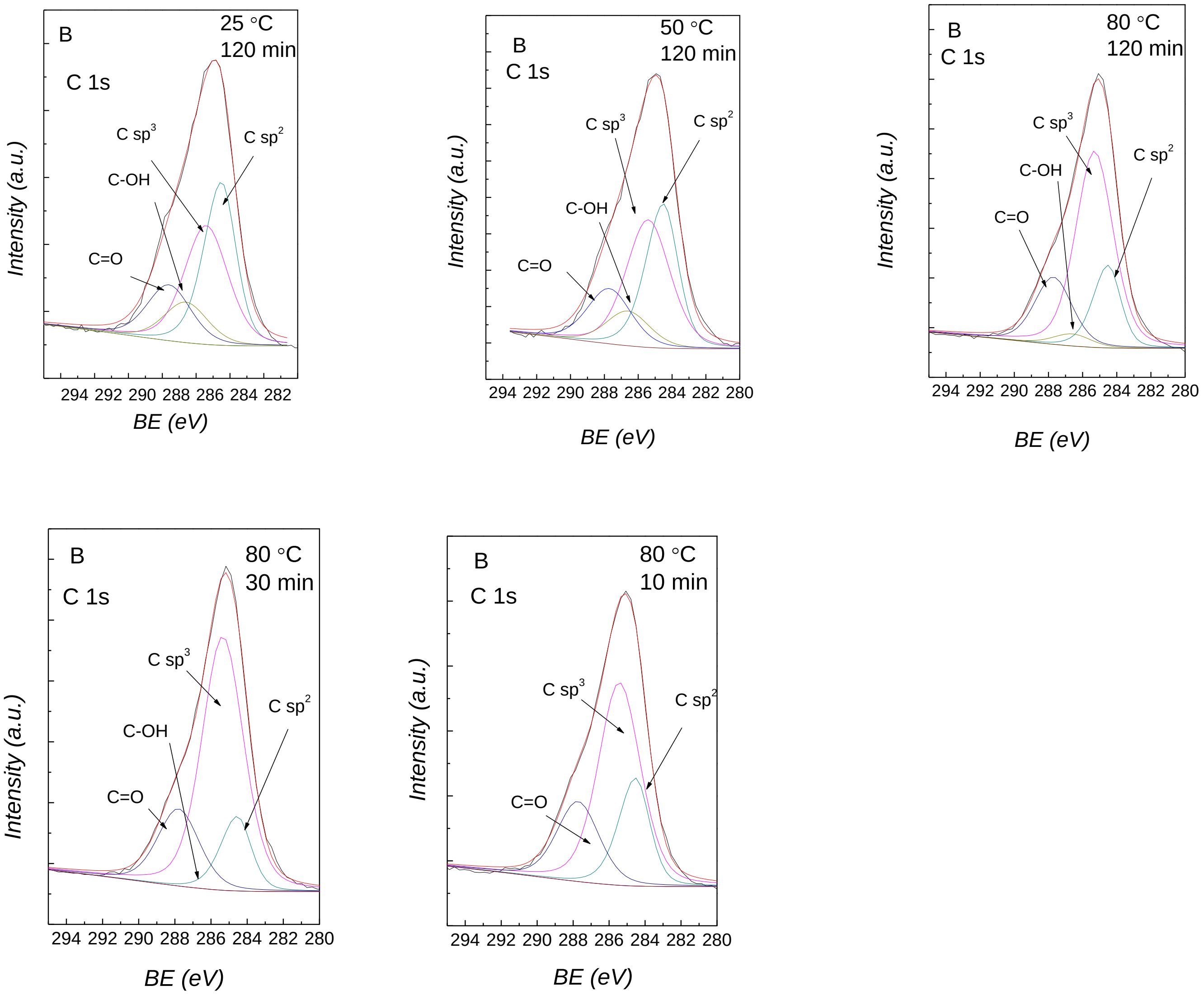
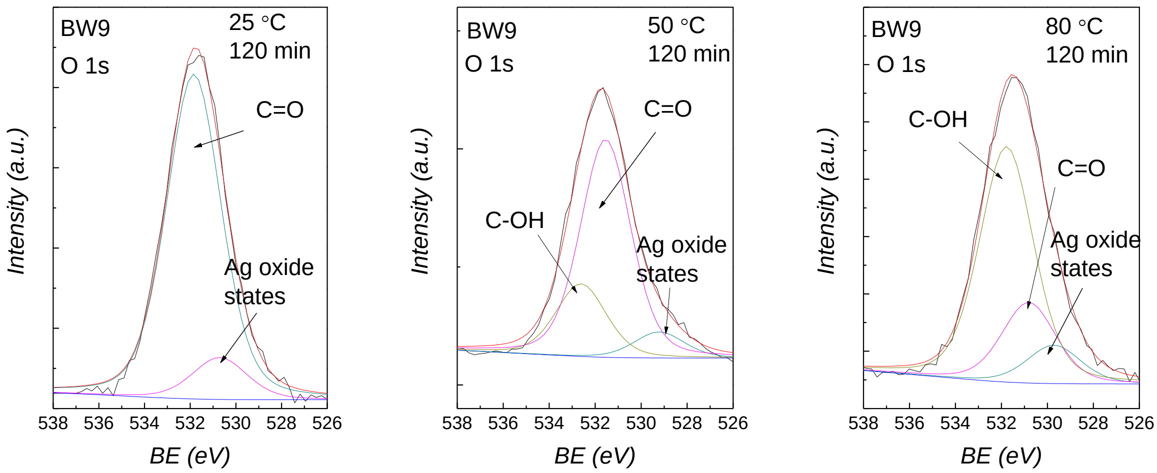


Figure S5b. The Gaussian–Lorentzian asymmetric functions to different atomic chemical states fitted C 1s XPS spectra recorded from BW9 and B nanocomposites synthesized at different temperatures and times.



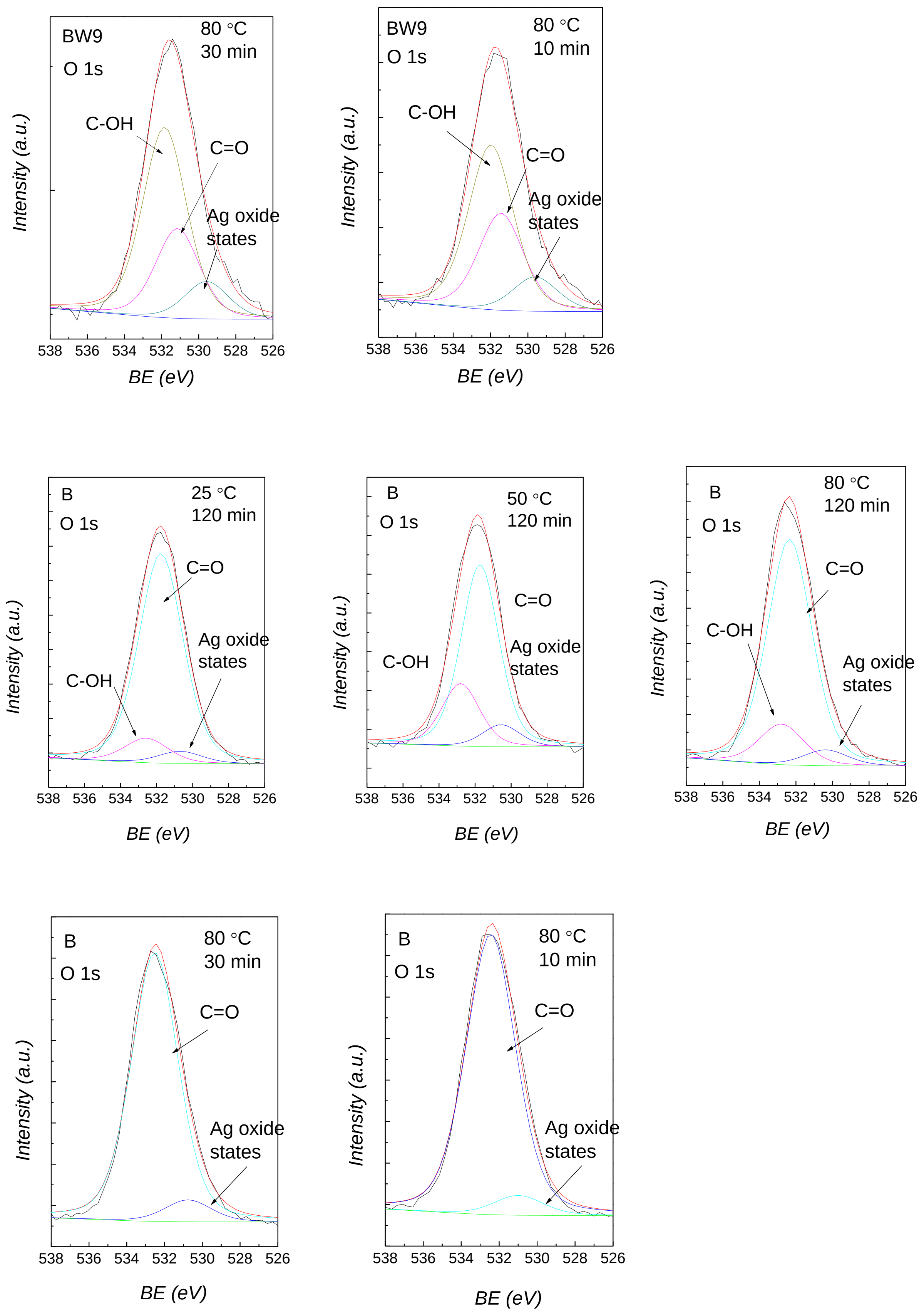


Figure S5c. The Gaussian–Lorentzian asymmetric functions to different atomic chemical states fitted O 1s XPS spectra recorded from BW9 and B nanocomposites synthesized at different temperatures and times.

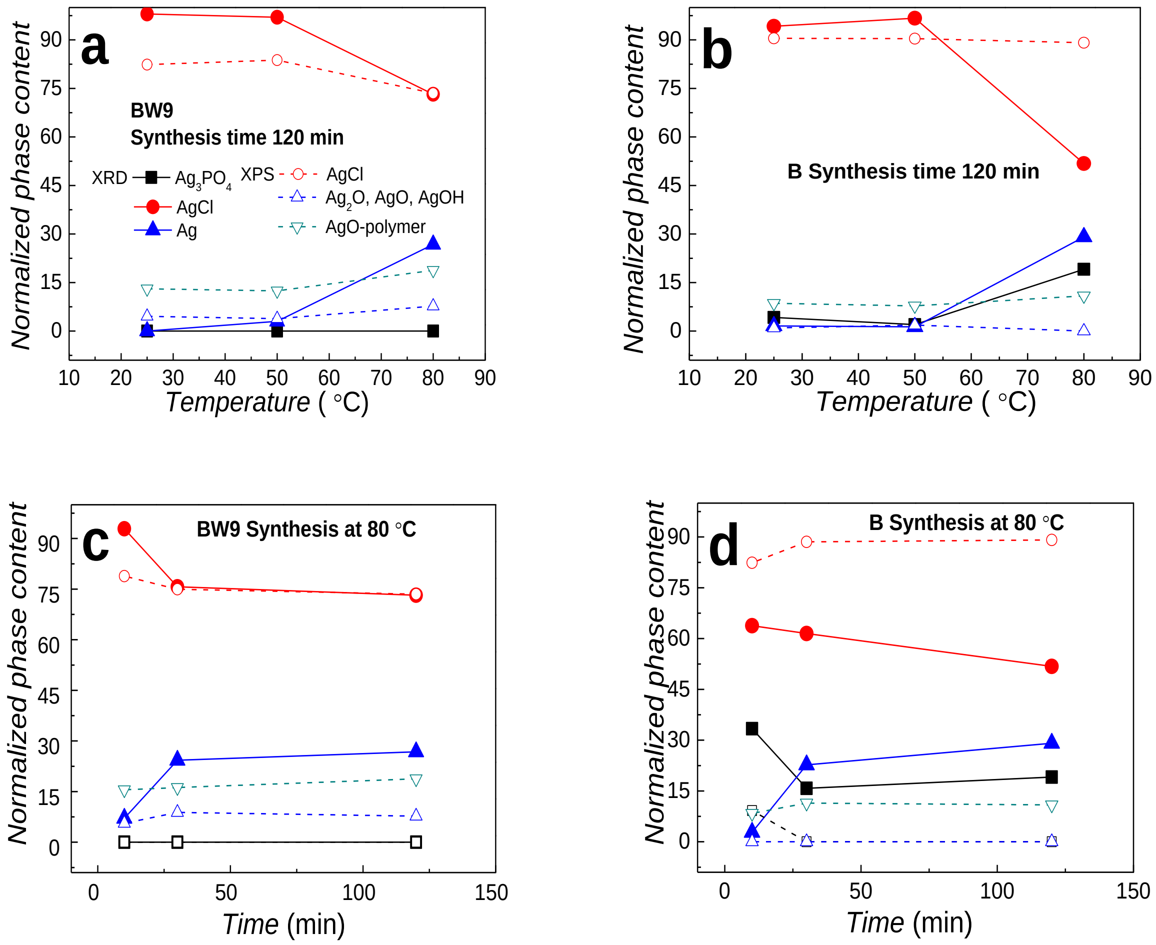


Figure S6. Weight and normalized phase content comparison resulting from XRD and XPS spectra, respectively, in nanocomposites synthesized at different temperatures and times using (a,c) brewery waste BW9 and (b,d) product B.

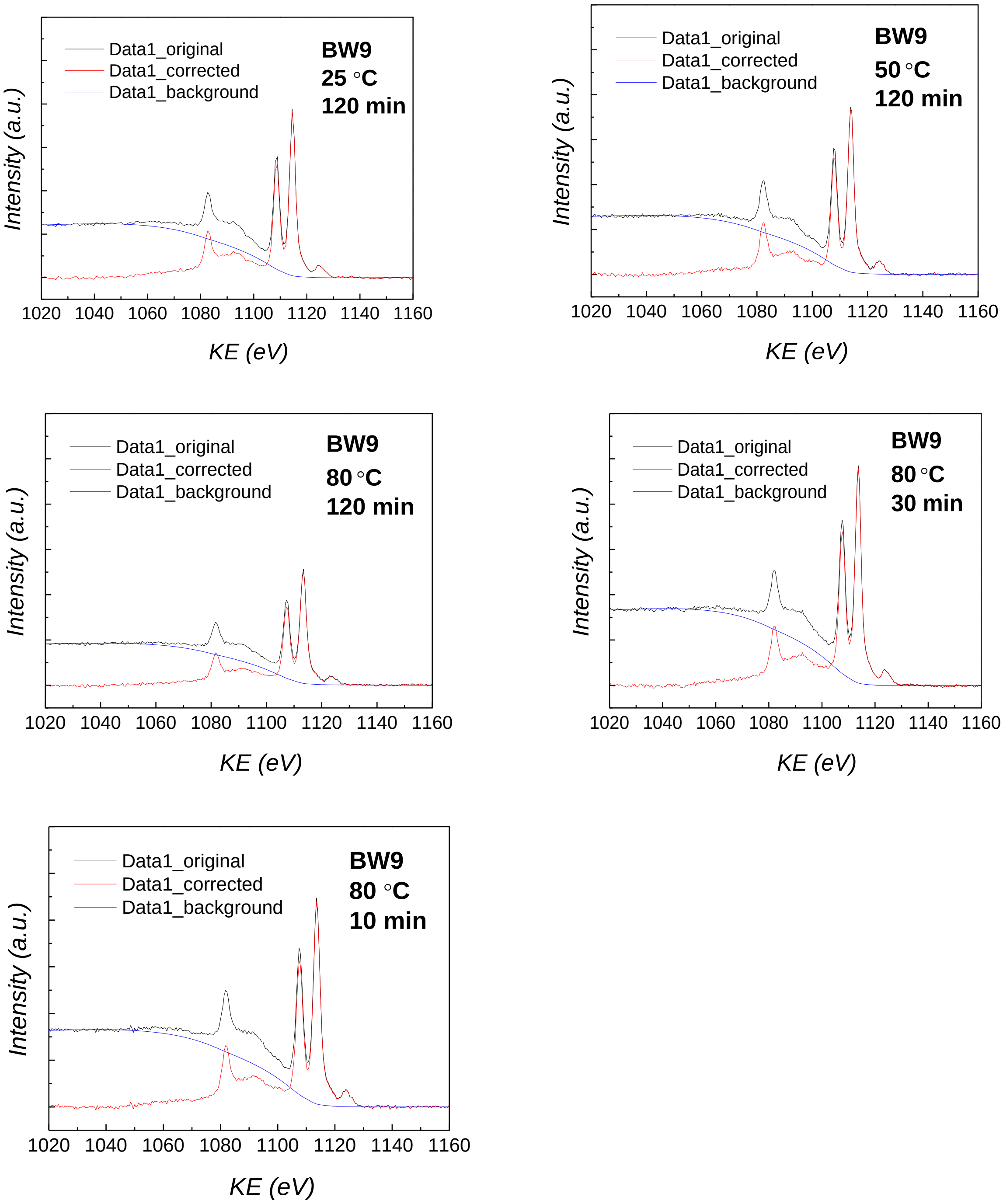


Figure S7. a. QUASES-Analyze software and Buried Layer (BL) model analysis of Ag $3d_{5/2/3-2}$ spectra for BW9 nanomaterials at different synthesis temperatures and times at 80 °C.

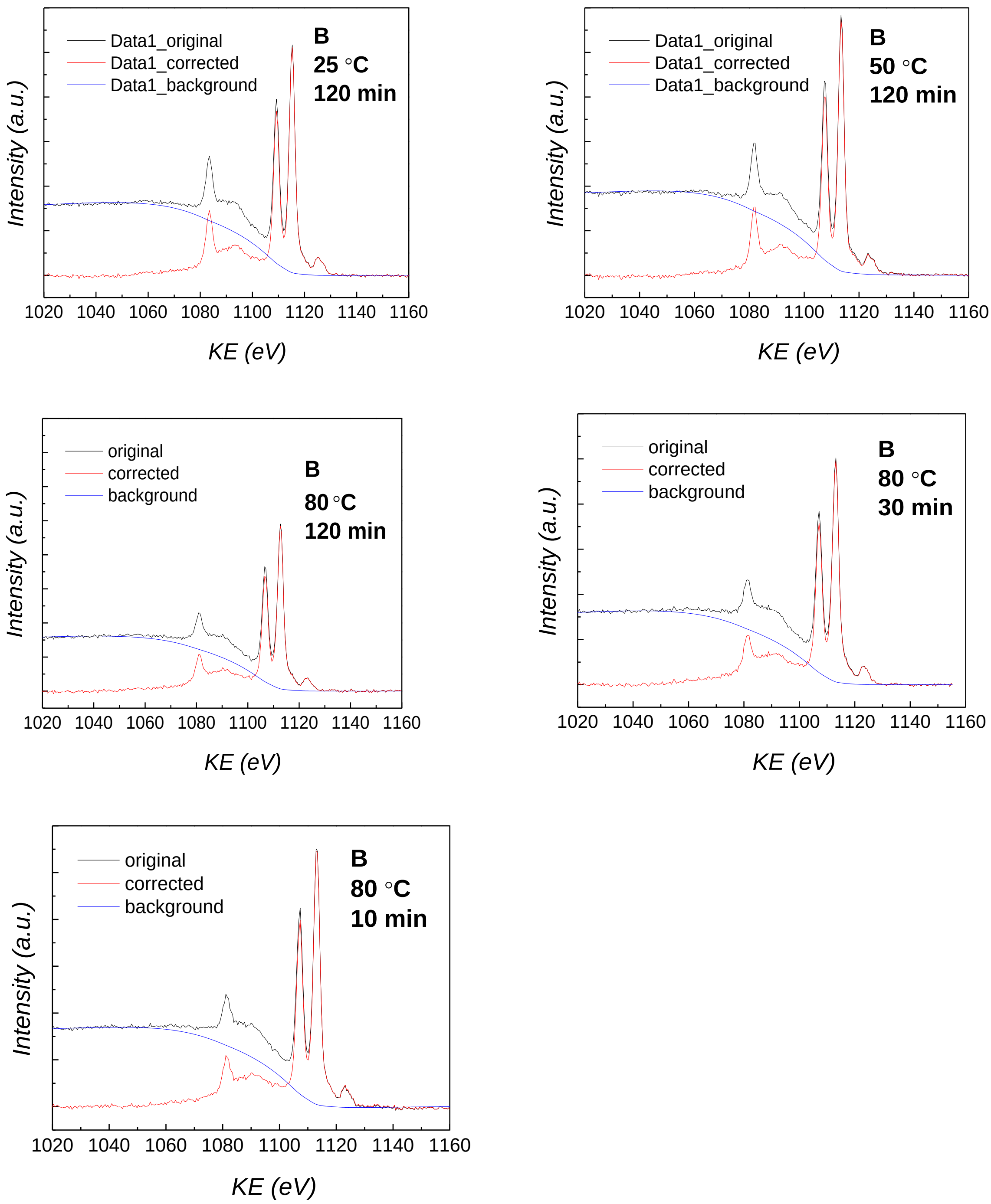


Figure S7. b. QUASES-Analyze software and Buried Layer (BL) model analysis of Ag $3d_{5/2/3-2}$ spectra for B nanomaterials at different synthesis temperatures and times at 80 °C.