Supporting Information (SI)

for

Nanocomposites of Graphene Oxide, Ag Nanoparticles, and Magnetic Ferrite Nanoparticles for Elemental Mercury (Hg^0) Removal

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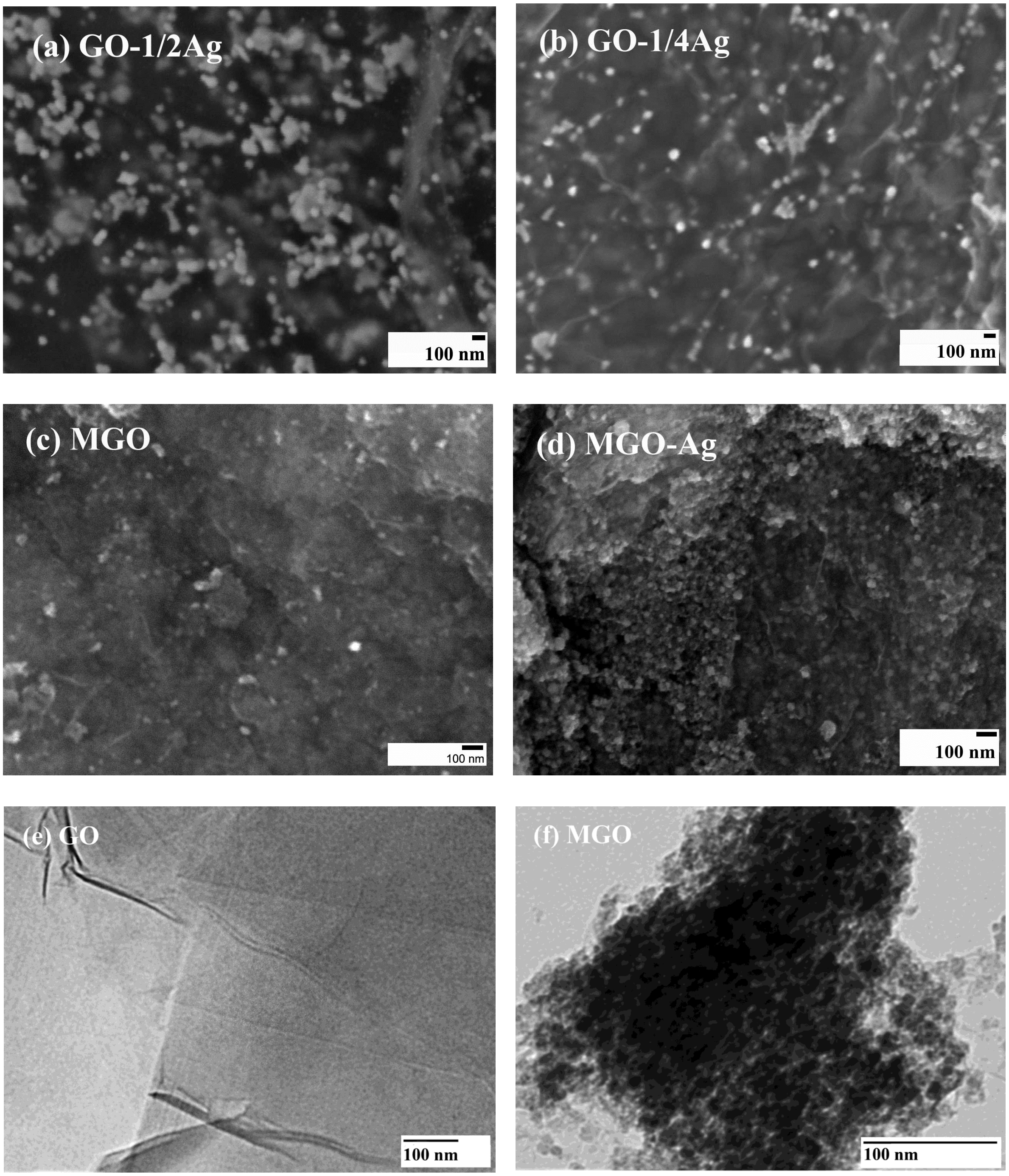
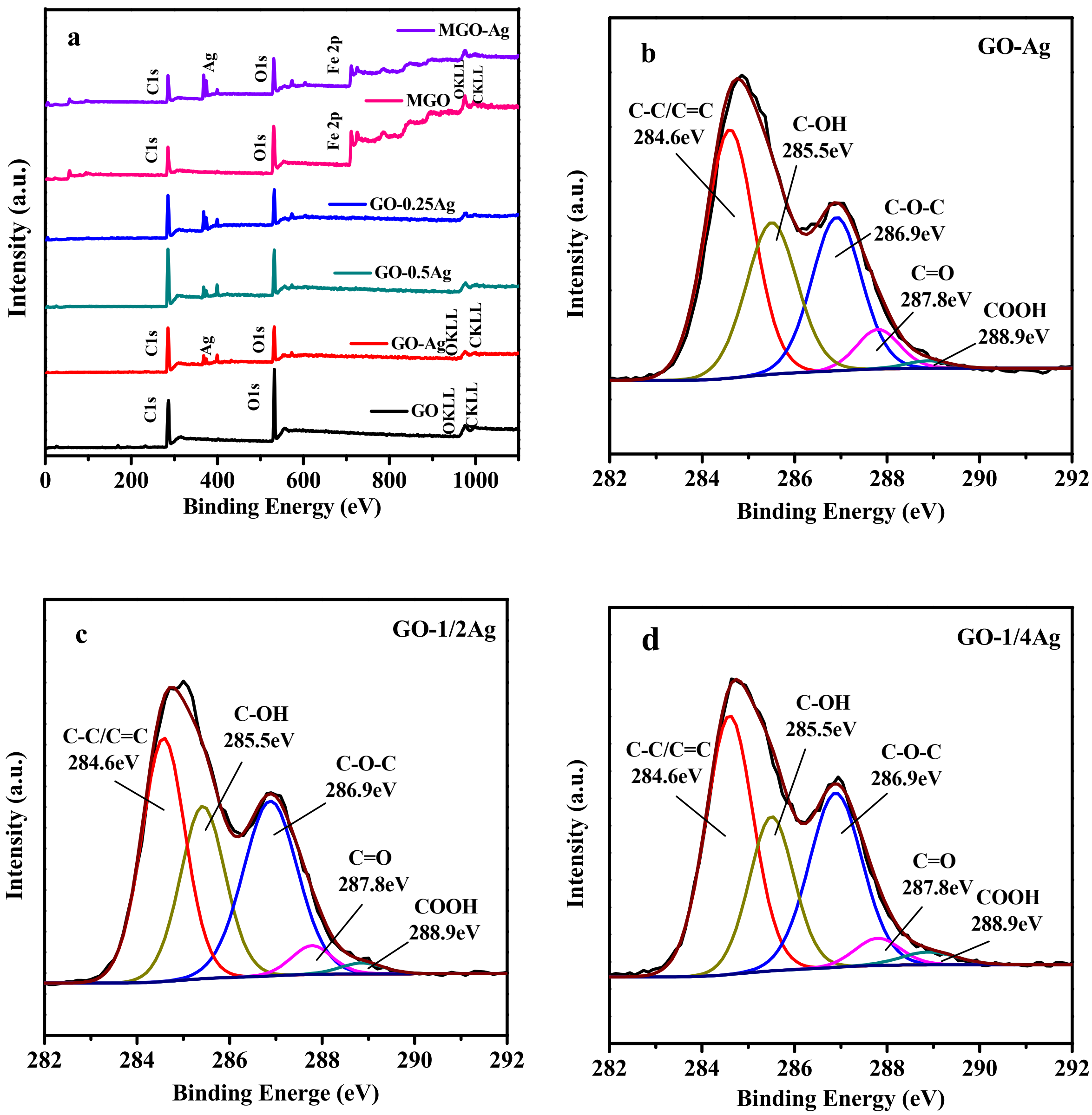


Figure S1. FE-SEM images of (a) GO-1/2Ag, (b) GO-1/4Ag, (c) MGO and (d) MGO-Ag. TEM image of (e) GO and (f) MGO.


a
MGO-Ag
MGO
GO-0.25Ag
GO-0.5Ag
GO-Ag
GO
C1s
Ag
O1s
Fe 2p
OKLL
CKLL
Intensity (a.u.)
Binding Energy (eV)
0
200
400
600
800
1000
b
GO-Ag
C-C/C=C
284.6eV
C-OH
285.5eV
C-O-C
286.9eV
C=O
287.8eV
COOH
288.9eV
Intensity (a.u.)
Binding Energy (eV)
282
284
286
288
290
292
c
GO-1/2Ag
C-C/C=C
284.6eV
C-OH
285.5eV
C-O-C
286.9eV
C=O
287.8eV
COOH
288.9eV
Intensity (a.u.)
Binding Energe (eV)
d
GO-1/4Ag
C-C/C=C
284.6eV
C-OH
285.5eV
C-O-C
286.9eV
C=O
287.8eV
COOH
288.9eV
Intensity (a.u.)
Binding Energy (eV)

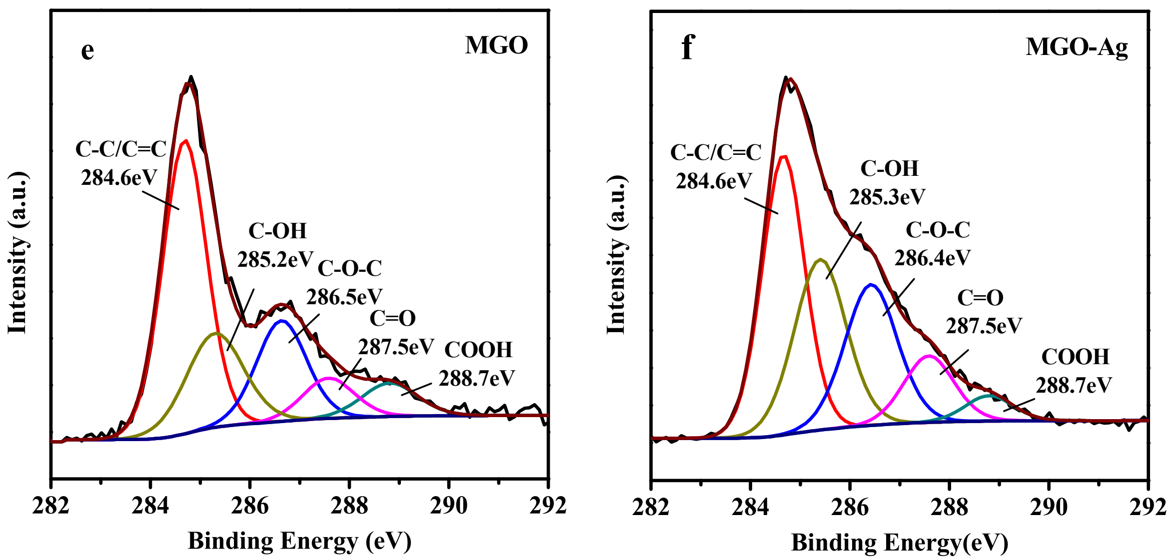


Figure S2. (a) XPS patterns of GO, GO-Ag, GO-1/2Ag, GO-1/4Ag, MGO and MGO-Ag. XPS spectra of C1s of (b) GO-Ag, (c) GO-1/2Ag, (d) GO-1/4Ag, (e) MGO and (f) MGO-Ag.

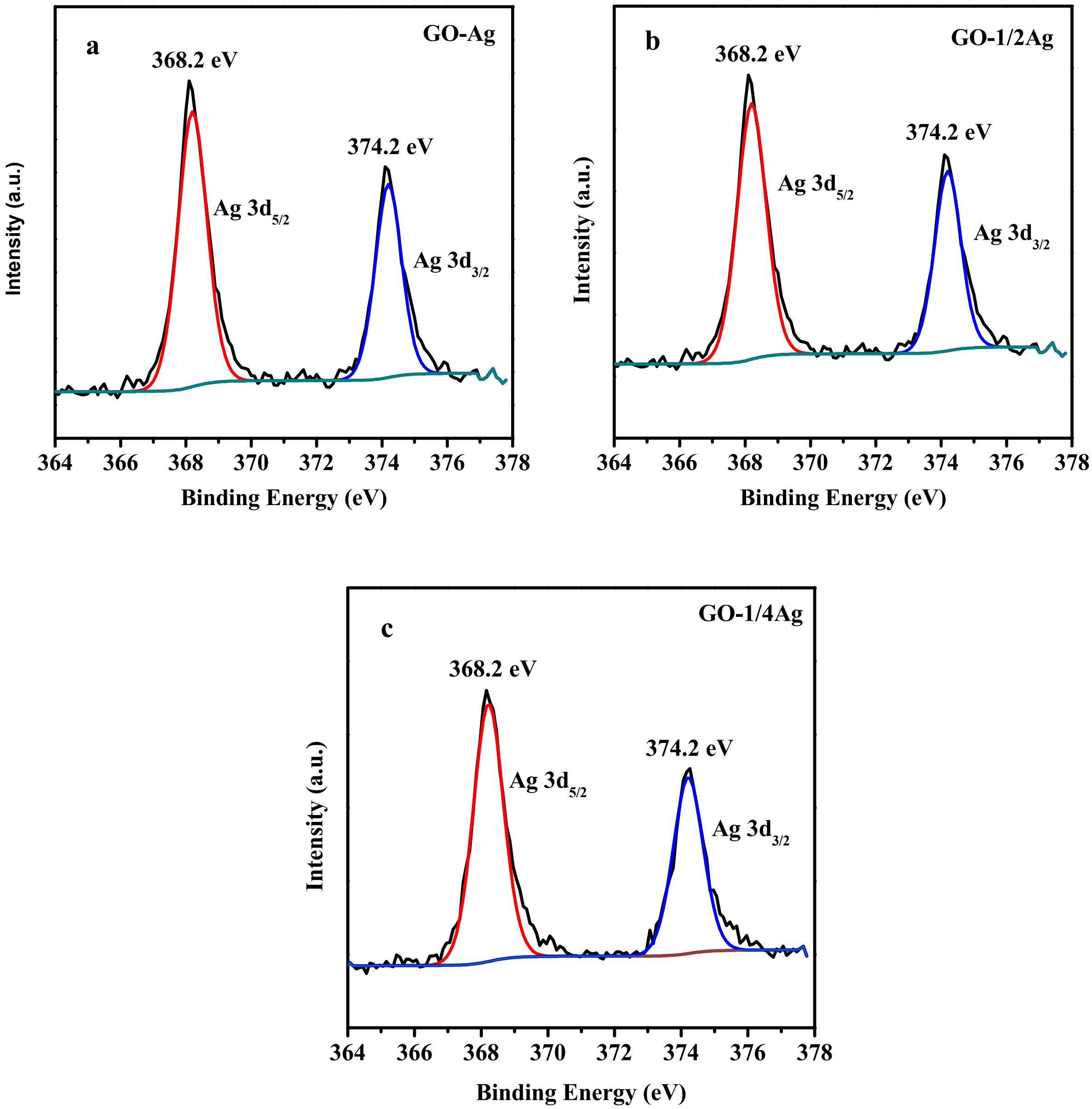


Figure S3. XPS spectra of silver of (a) GO-Ag, (b) GO-1/2Ag and (c) GO-1/4Ag.

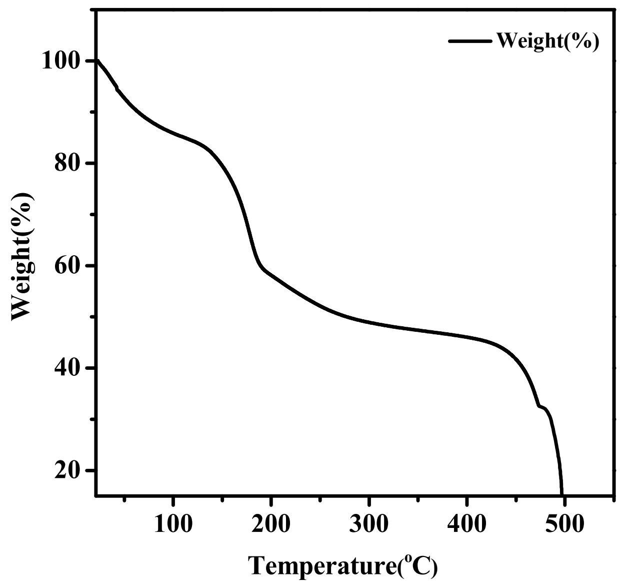


Figure S4. TGA curves of GO from room temperature to 550 °C: ~15% mass loss below 100 °C, a sharp mass loss (~25%) at ~150 °C, and an additional ~10% mass loss from ~200 °C to ~300 °C.

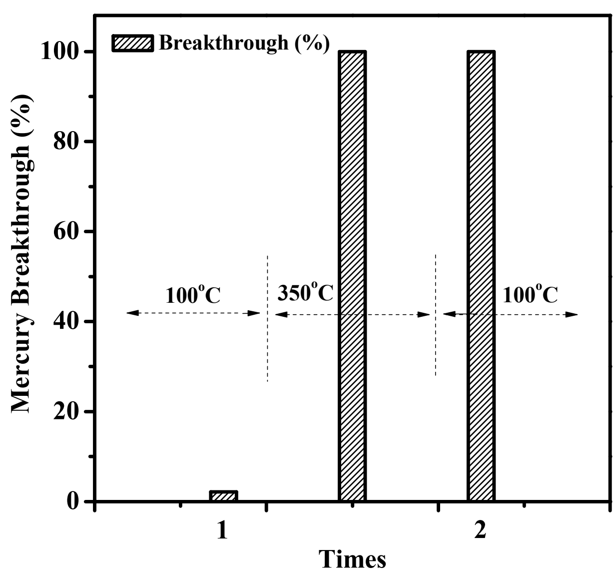


Figure S5. GO mercury breakthrough before and after thermal treatment at 350 °C. The mercury breakthrough remains almost 100% after the thermal treatment indicating the GO lost its mercury removal capability after thermal treatment.

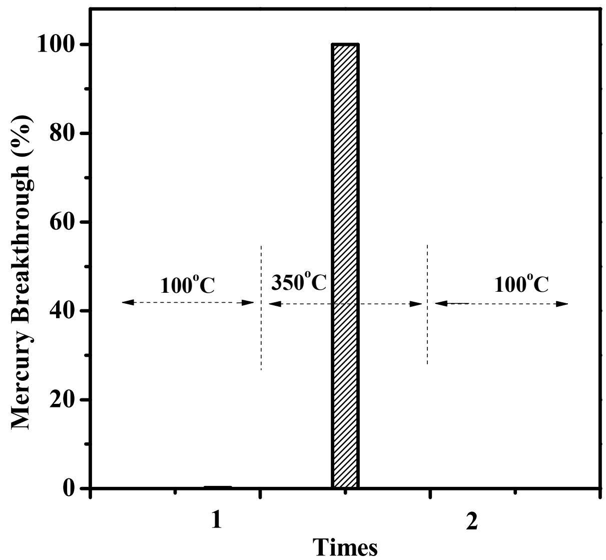


Figure S6. GO-Ag mercury breakthrough before and after thermal treatment at 350 °C. The mercury breakthrough remains almost 0% after the thermal treatment indicating the GO-Ag fully recovered its mercury removal capability after thermal treatment.

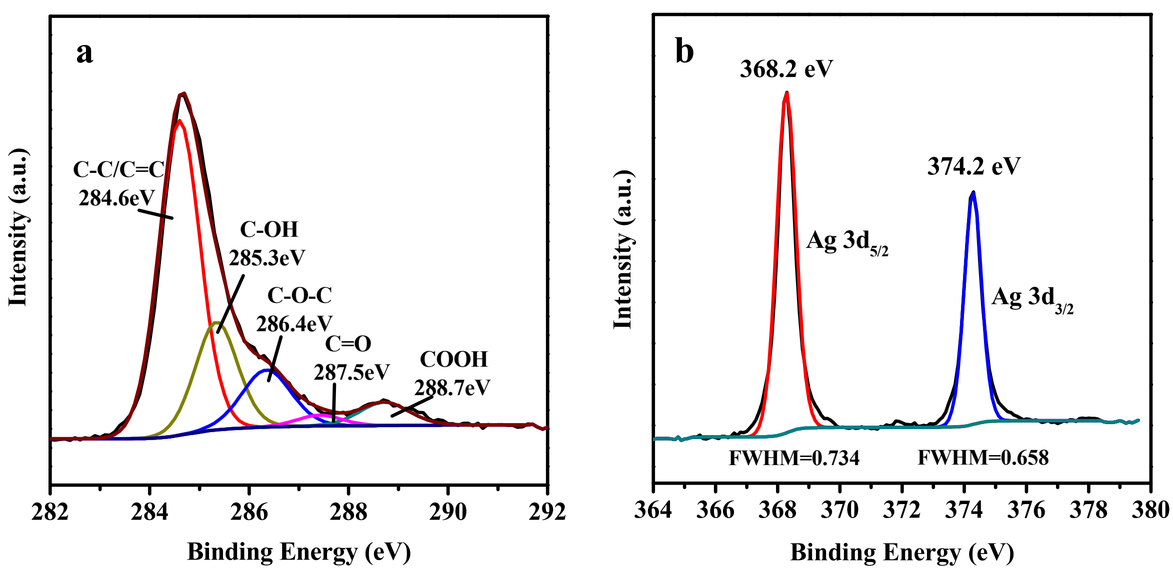


Figure S7. XPS spectra of (a) C of MGO-Ag and (b) Ag of MGO-Ag after recycling test.

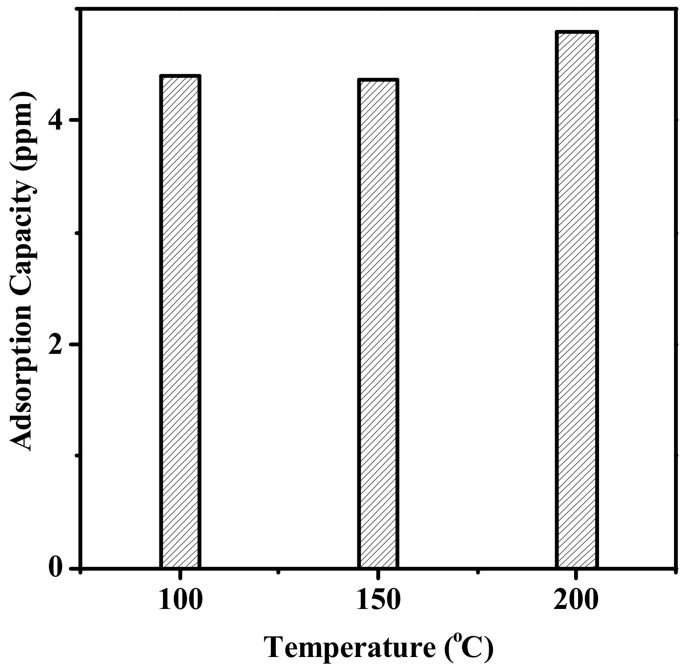
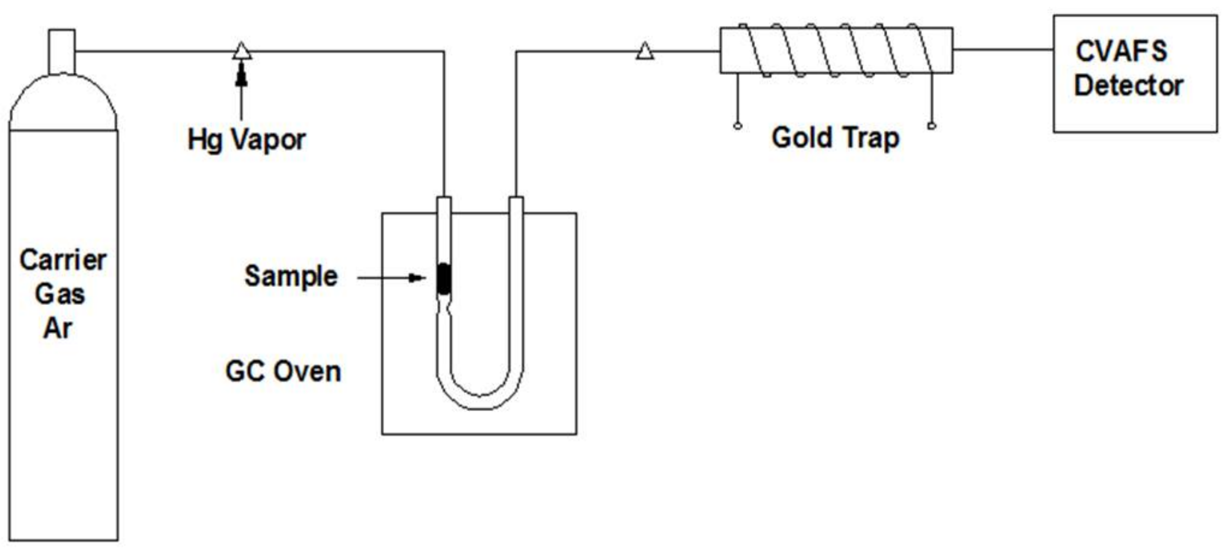


Figure S8. The Hg^0 adsorption capacity of MGO-Ag in continuous simulated flue gases over 5 min from 100 °C to 200 °C.



Scheme S1. Experiment setup for mercury breakthrough test (15 mg GO/GO-Ag/MGO/MGO-Ag and 200μL of Hg^0 standard vapor injection at room temperature were applied each time).