Supplementary information

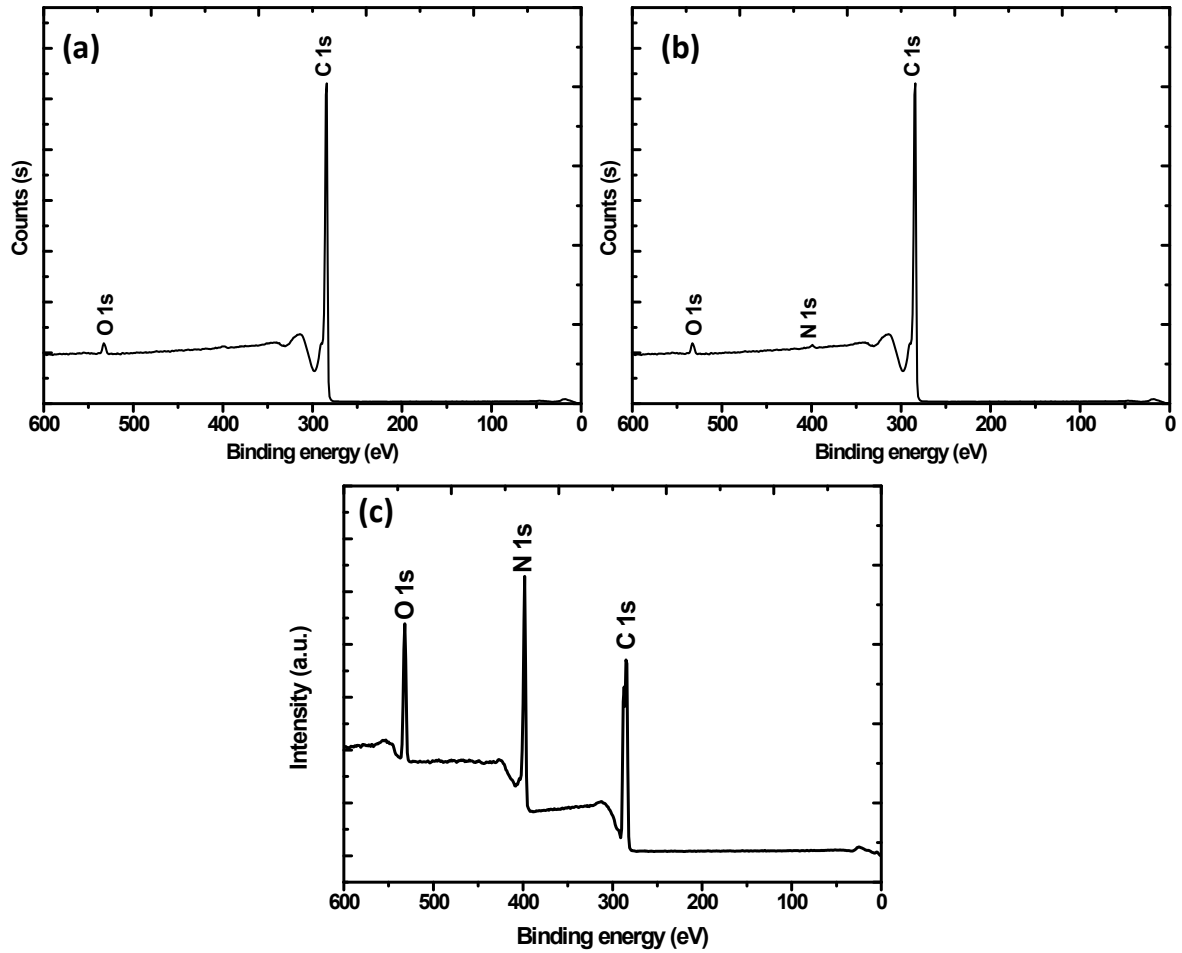

Figure S1: XPS survey scan of (a) rGO, (b) N-rGO, and (c) g-C_3N_4.

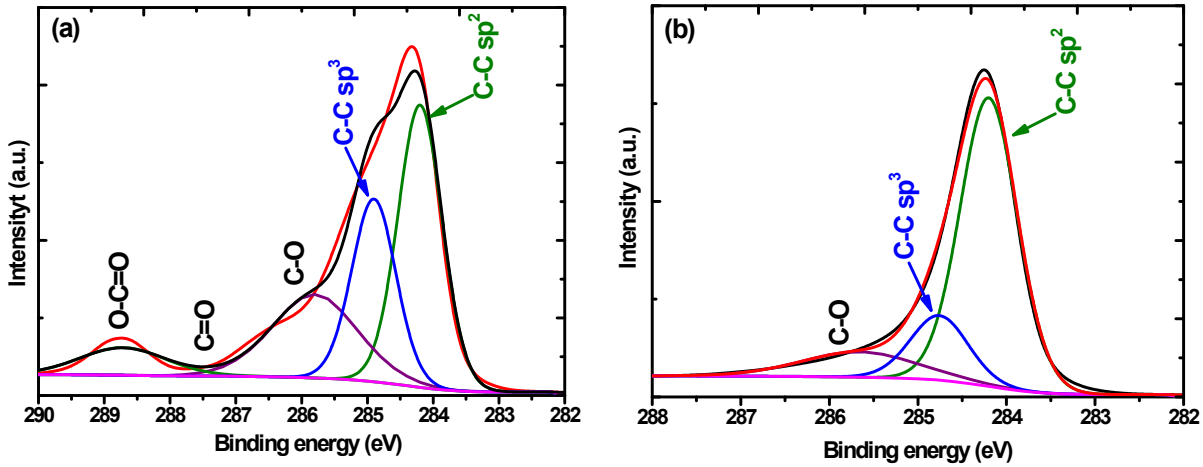

Figure S2: C1s XPS spectrum of (a) rGO and (b) N-rGO.

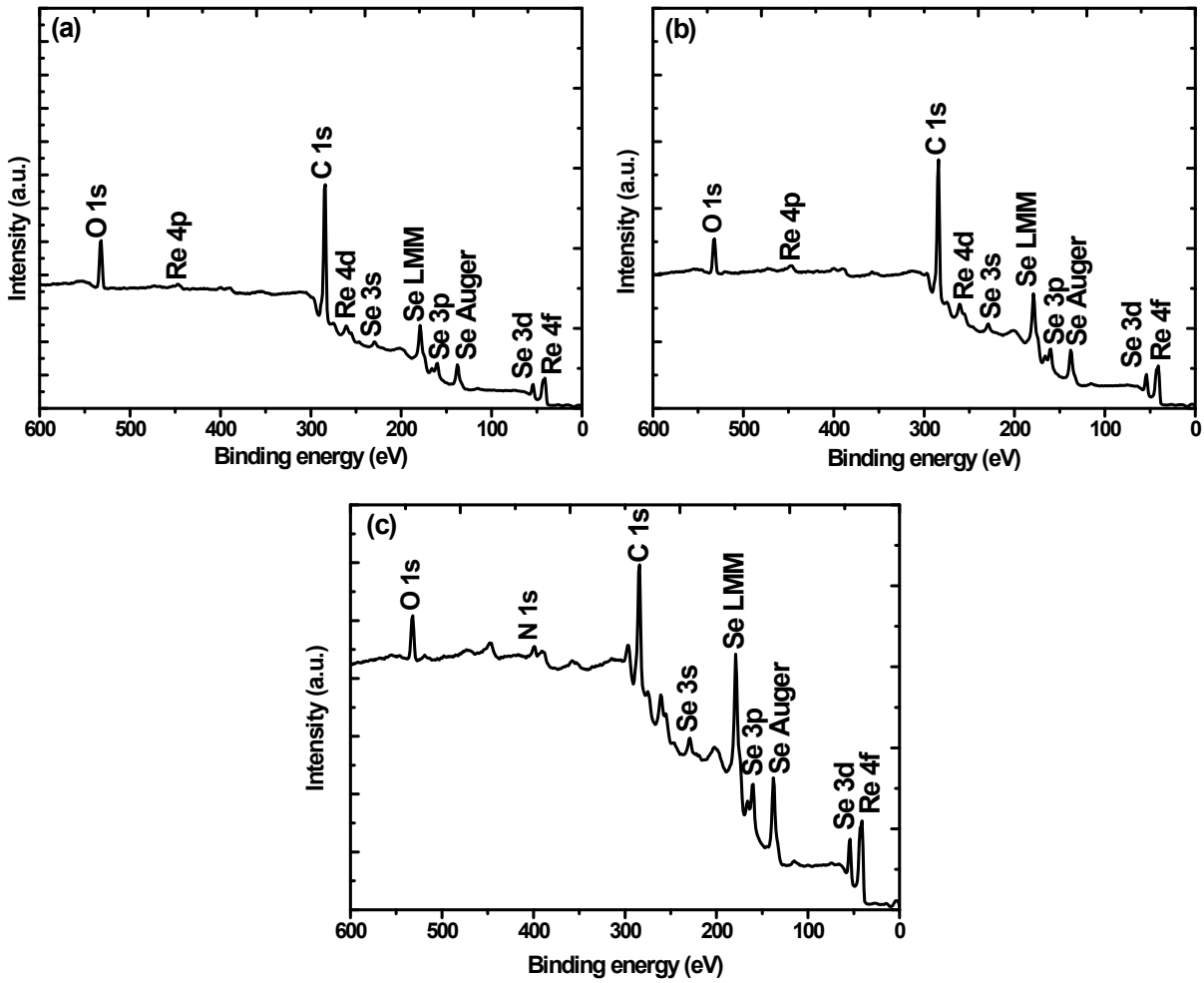

Figure S3: XPS survey spectra of (a) $ReSe_2$-rGO, (b) $ReSe_2$-N-rGO, and (c) $ReSe_2$-g-C_3N_4.

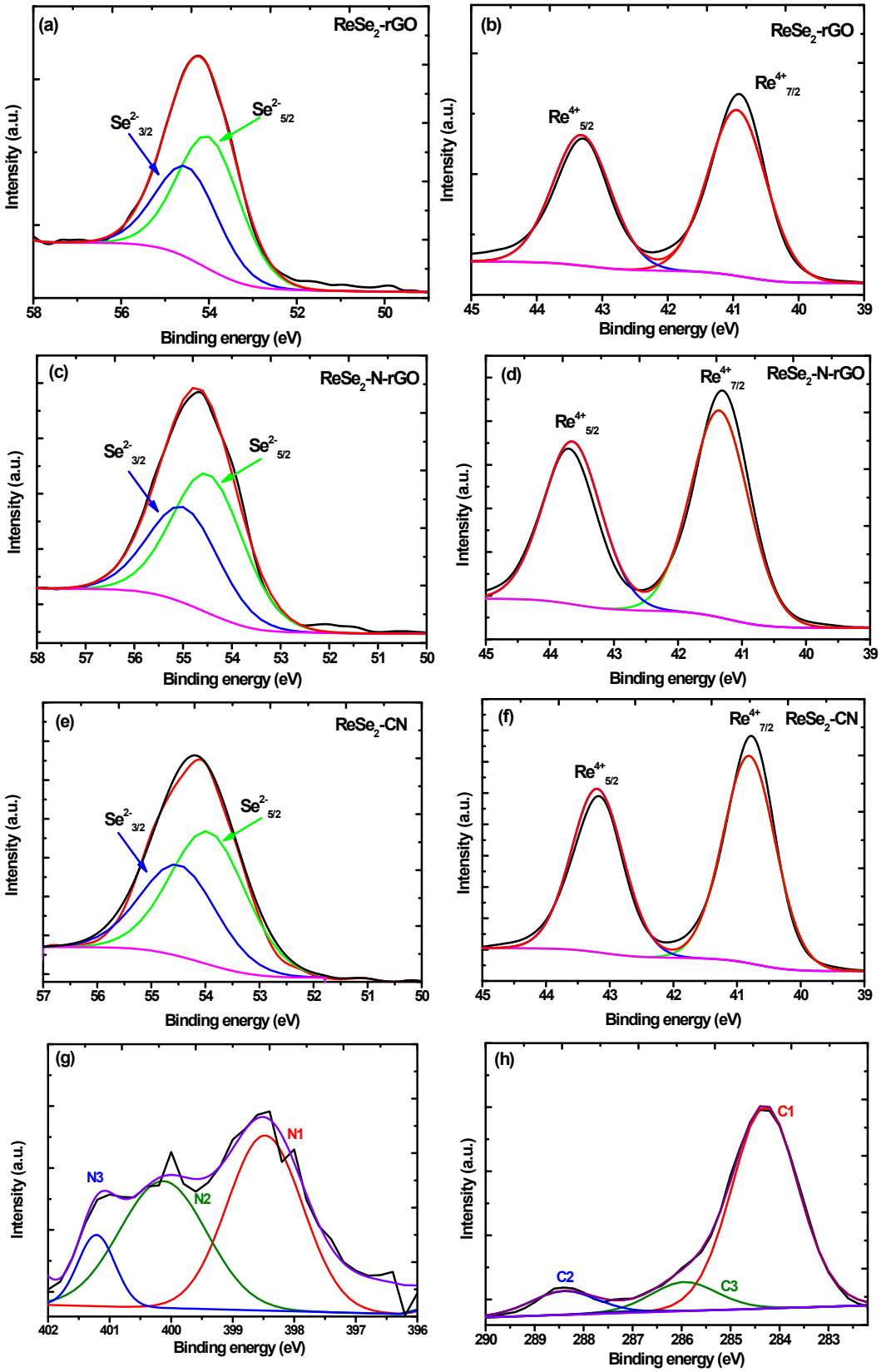
(a)
ReSe2-rGO
Se2-3/2
Se2-5/2
Intensity (a.u.)
Binding energy (eV)
(b)
ReSe2-rGO
Re4+5/2
Re4+7/2
Intensity (a.u.)
Binding energy (eV)
(c)
ReSe2-N-rGO
Se2-3/2
Se2-5/2
Intensity (a.u.)
Binding energy (eV)
(d)
ReSe2-N-rGO
Re4+5/2
Re4+7/2
Intensity (a.u.)
Binding energy (eV)
(e)
ReSe2-CN
Se2-3/2
Se2-5/2
Intensity (a.u.)
Binding energy (eV)
(f)
ReSe2-CN
Re4+5/2
Re4+7/2
Intensity (a.u.)
Binding energy (eV)
(g)
N1
N2
N3
Intensity (a.u.)
Binding energy (eV)
(h)
C1
C2
C3
Intensity (a.u.)
Binding energy (eV)

Figure S4: (a-f) Re^{4+} and Se^{2-} high-resolution spectrum of $ReSe_2$-rGO, $ReSe_2$-N-rGO, and $ReSe_2$-g-C_3N_4. (g) N1s spectrum of $ReSe_2$-g-C_3N_4. (h) C1s spectrum of $ReSe_2$-g-C_3N_4.

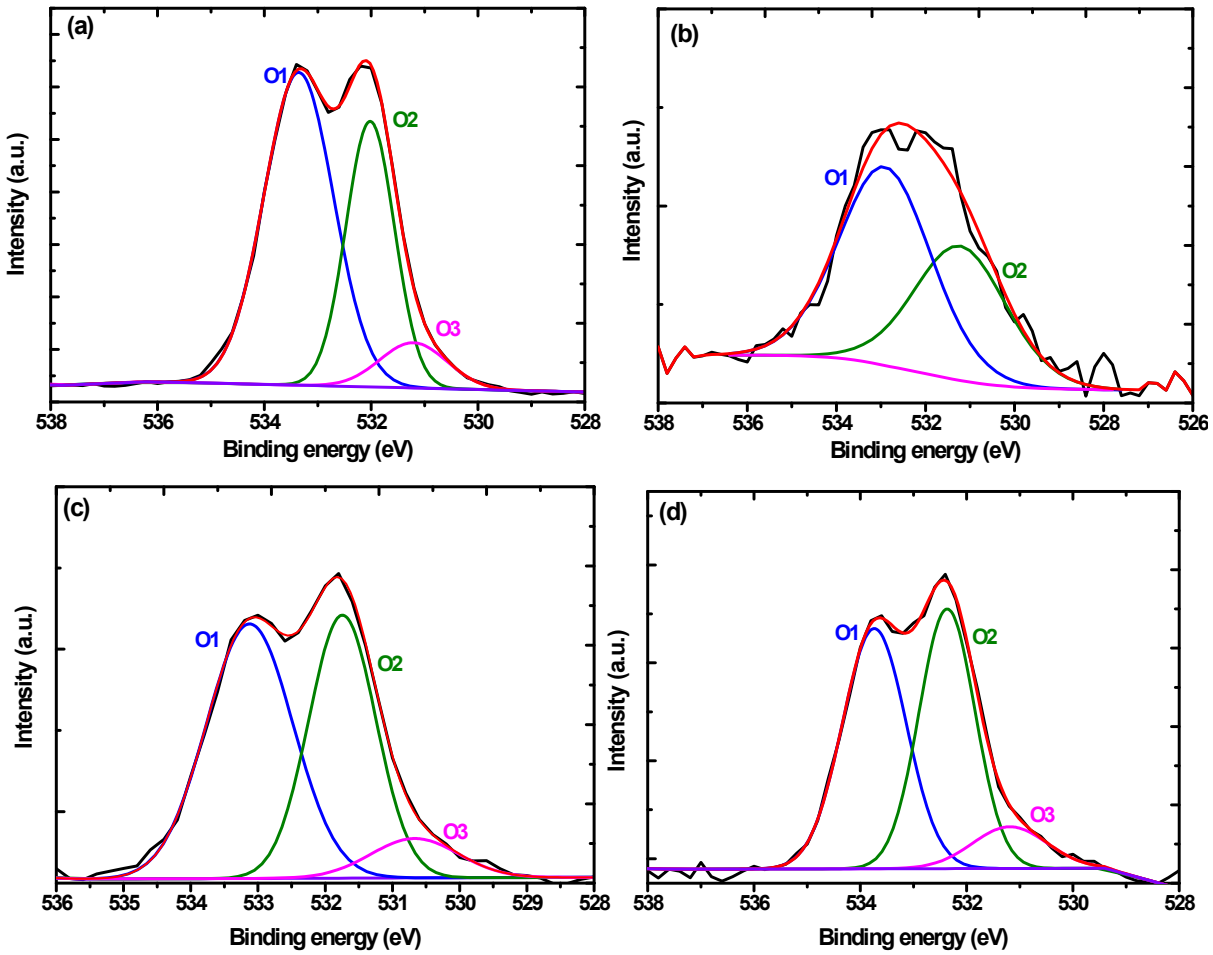

Figure S5: O 1s spectrum of (a) rGO, (b) N-rGO, (c) $ReSe_2$-rGO, (d) $ReSe_2$-N-rGO.

The O 1s spectra of the rGO, N-rGO, $ReSe_2$-rGO, and $ReSe_2$-N-rGO. O1 was assigned to C-O, O2 was assigned to C=O, and O3 was assigned to O-C=O.

Table S1: Summary of the binding energy of Re^{4+} assignments.

Sample	Assignment	Binding energy (eV)
$ReSe_2$	$4f_{5/2}$	43.6
	$4f_{7/2}$	41.2
$ReSe_2$-rGO	$4f_{5/2}$	531.7
	$4f_{7/2}$	533.2
$ReSe_2$-N-rGO	$4f_{5/2}$	532.2
	$4f_{7/2}$	533.5

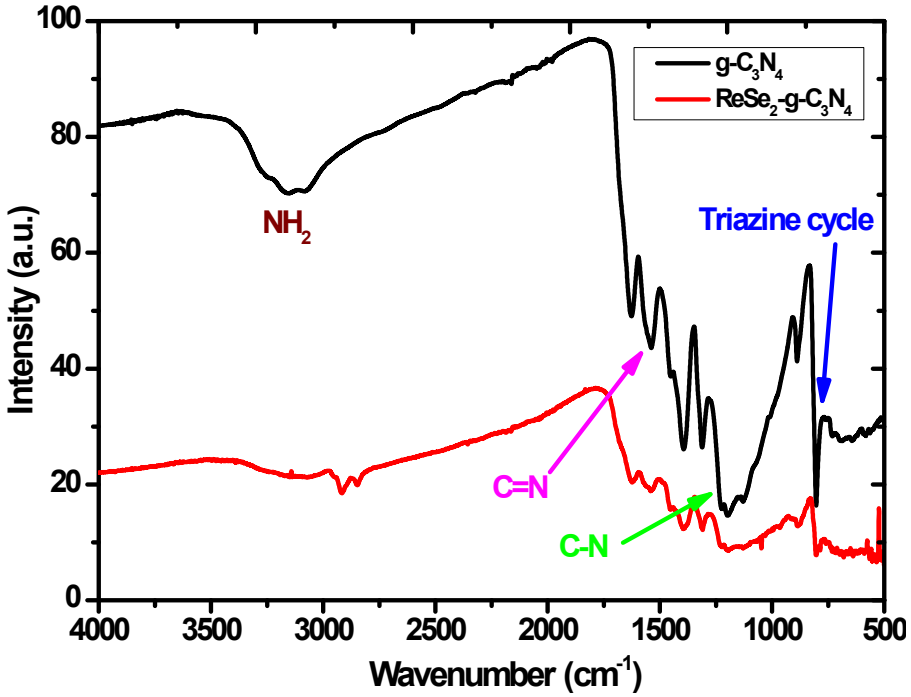

Figure S6: FTIR spectrum of $ReSe_2$-g-C_3N_4.

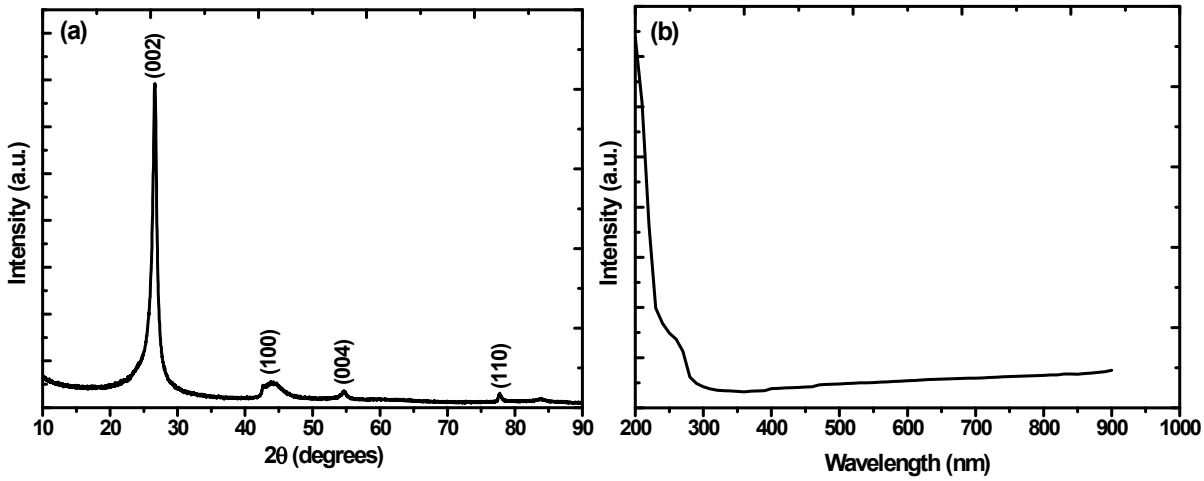

Figure S7: (a) Powder pattern of rGO-Re and (b) UV-Vis spectrum of rGO-Re.

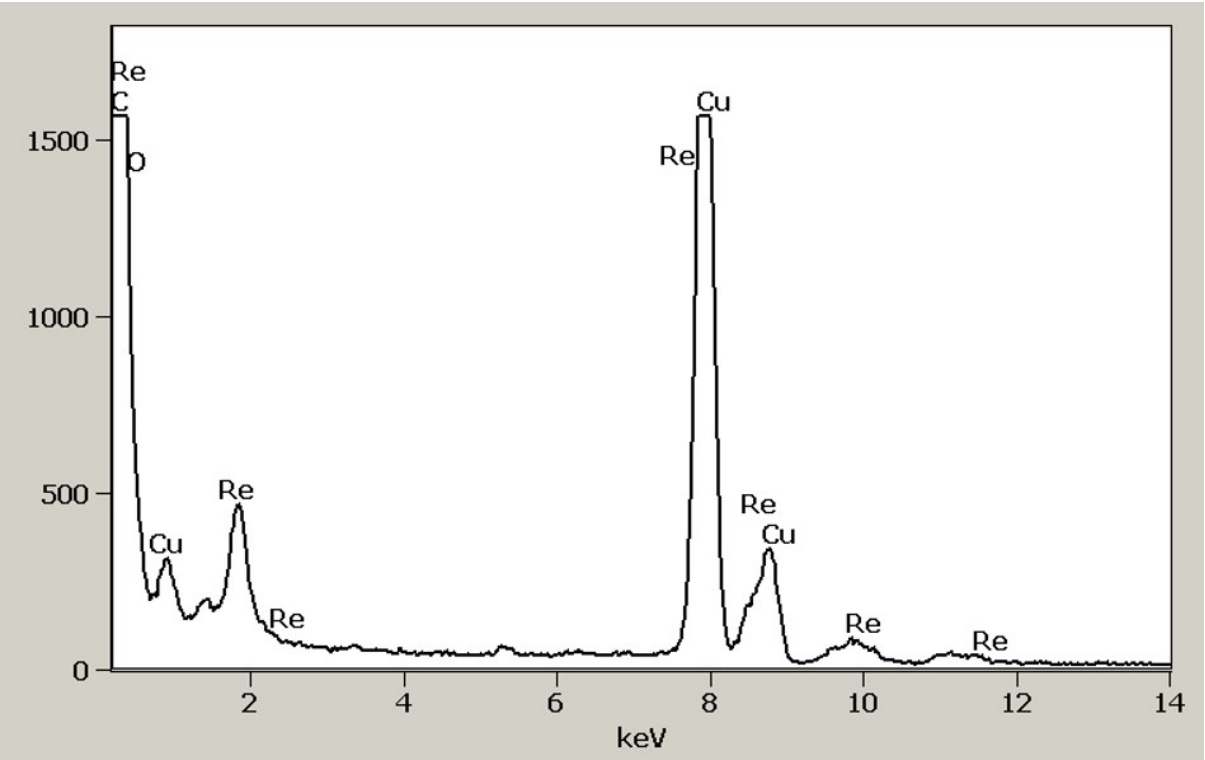

Figure S8: EDS spectrum of rGO-Re.

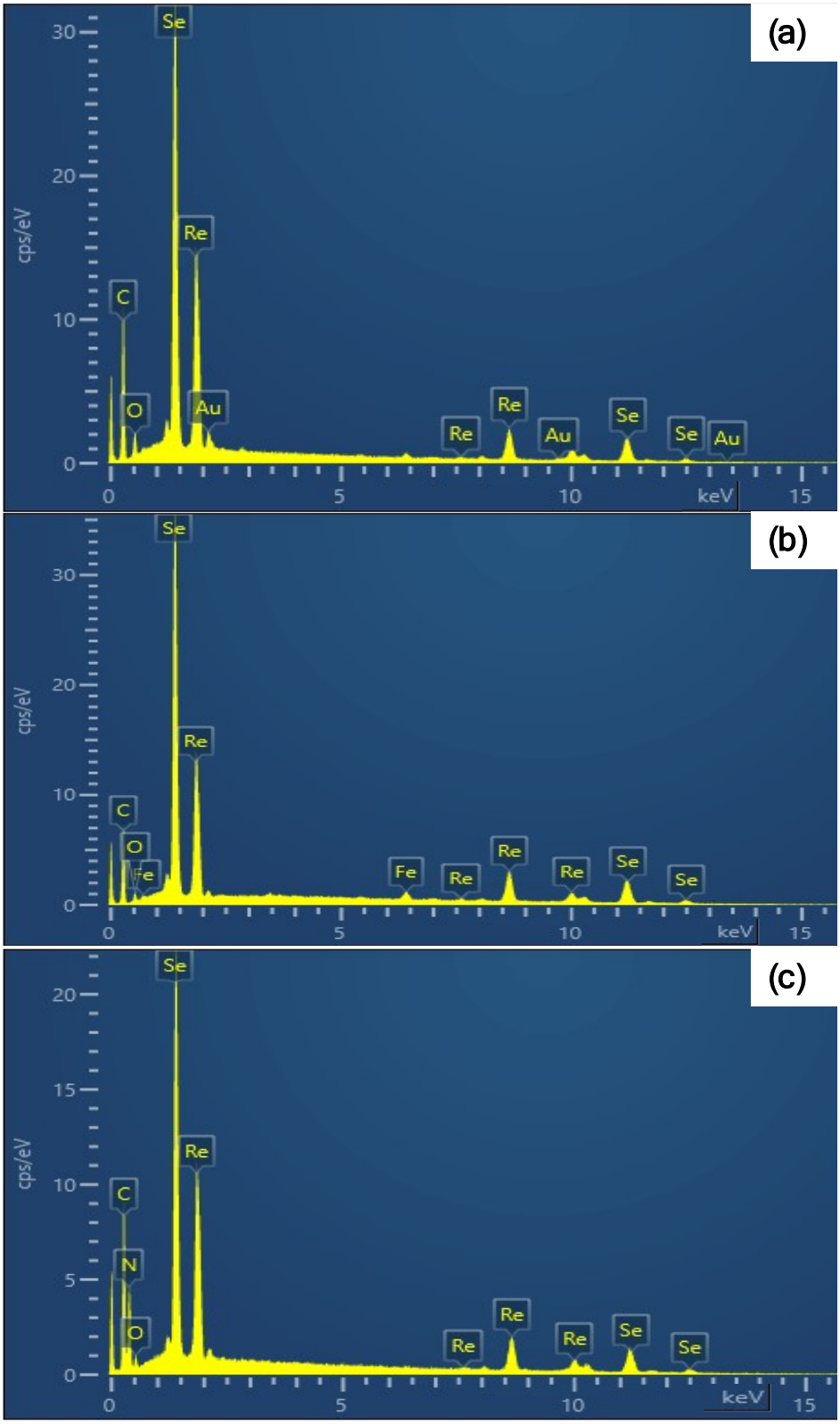

Figure S9: EDX spectra images of (a) $ReSe_2$-rGO, (b) $ReSe_2$-N-rGO, and (c) $ReSe_2$-g-C_3N_4.

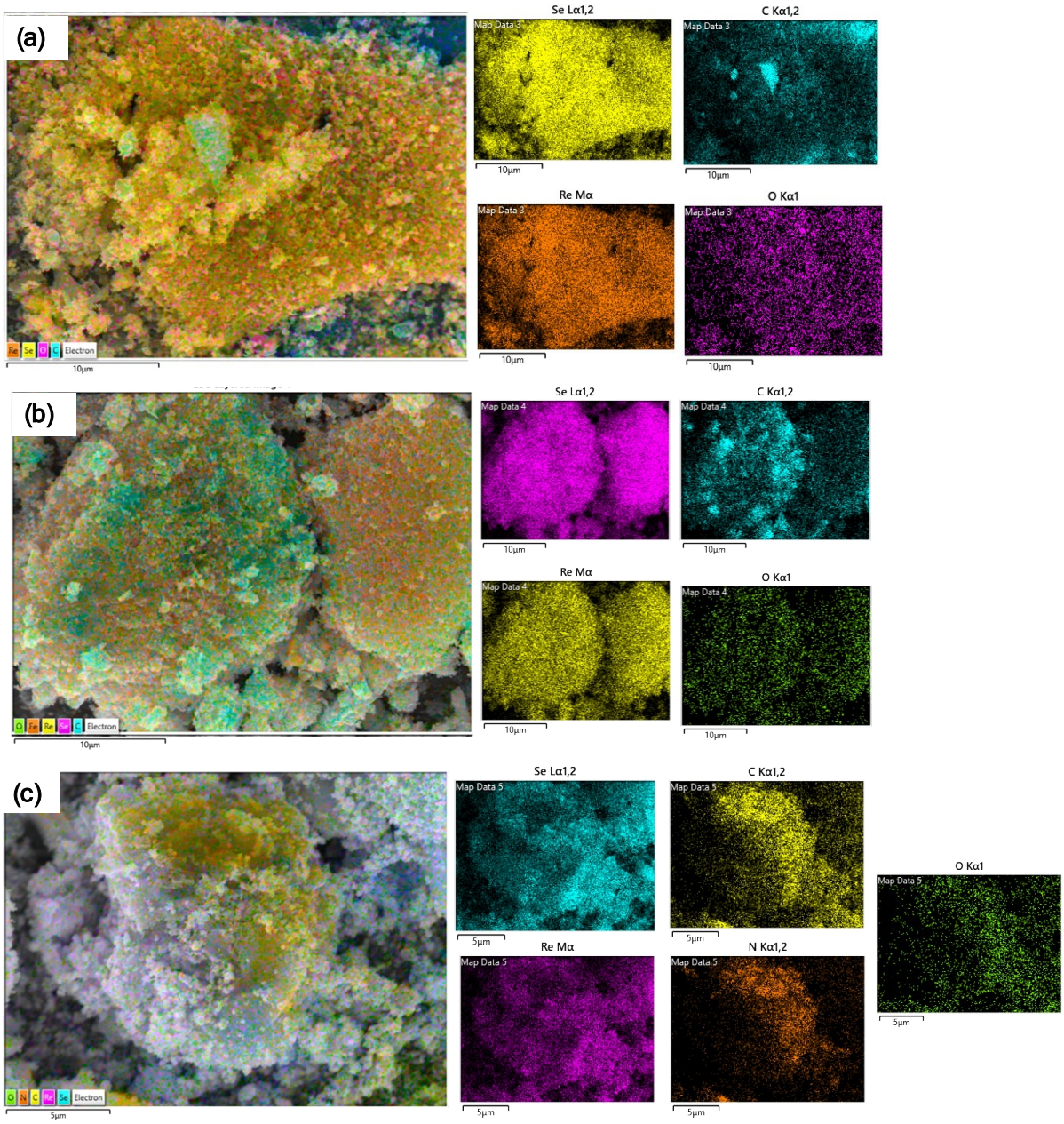

Figure S10: Elemental mapping of (a) $ReSe_2$-rGO, (b) $ReSe_2$-N-rGO, and (c) $ReSe_2$-g-C_3N_4.

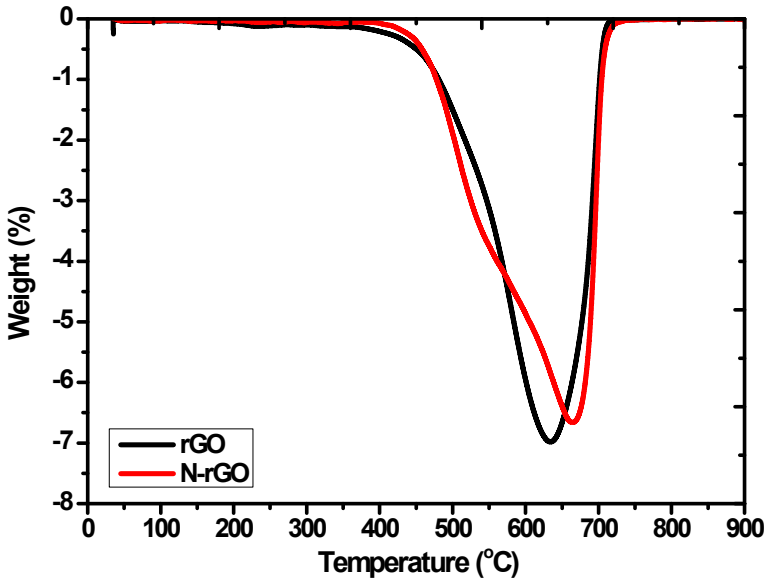

Figure S11: TGA derivative curves for rGO and N-rGO.

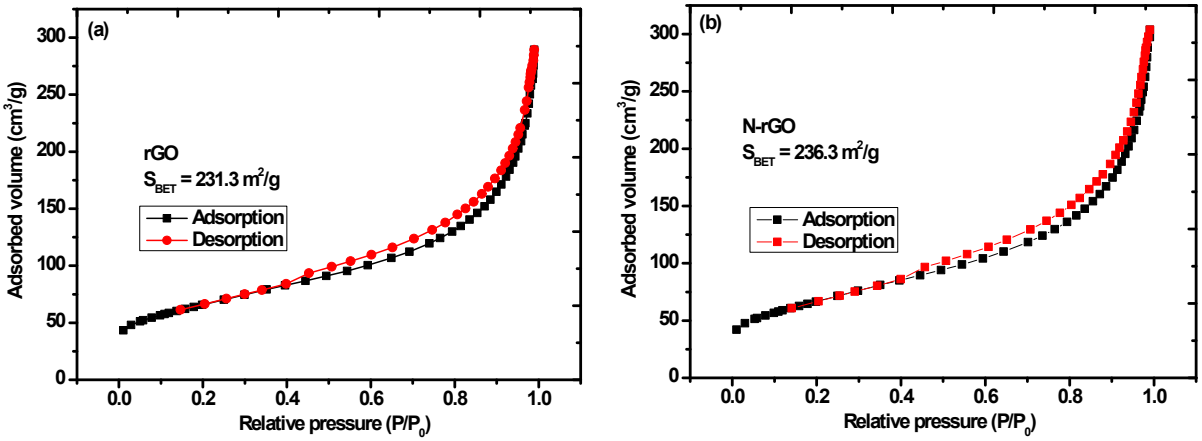

Figure S12: Adsorption-desorption isotherm of (a) rGO and (b) N-rGO.

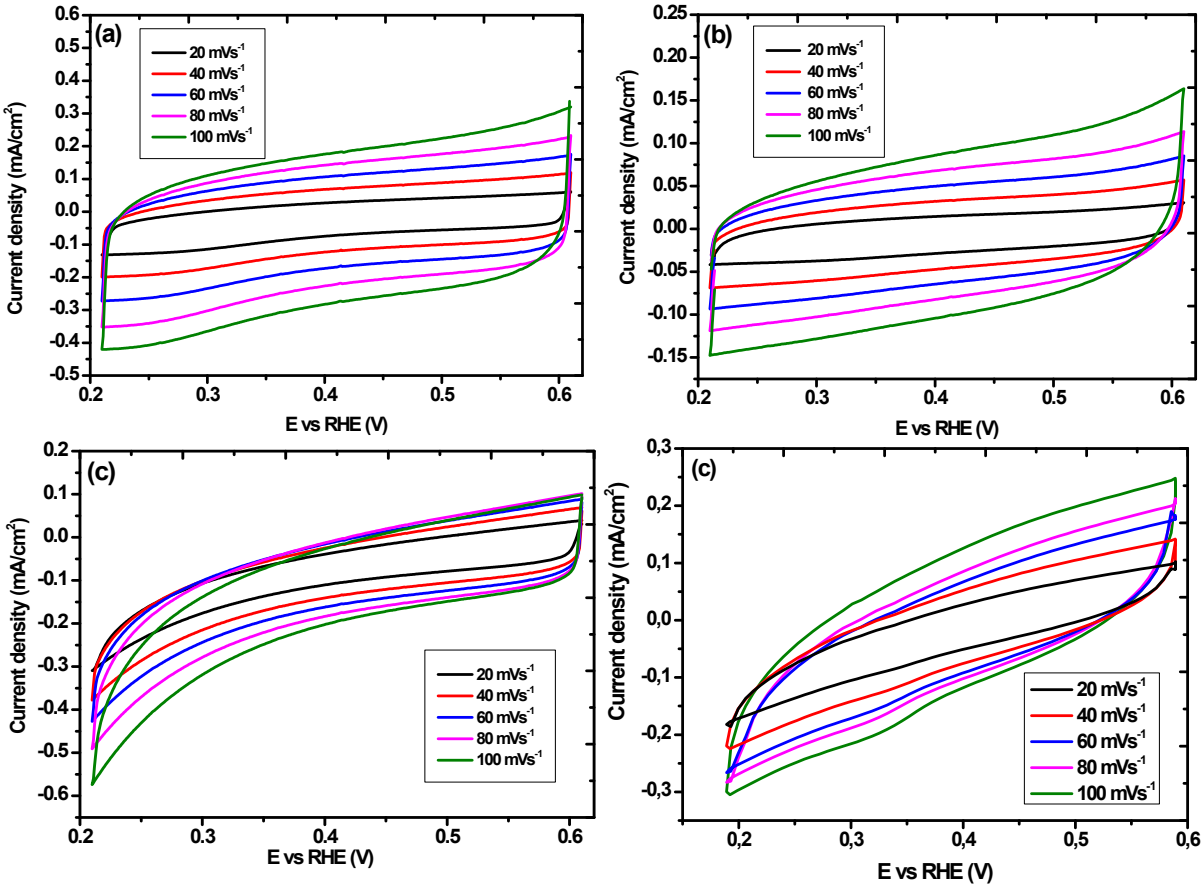

Figure S13: Cdl plots of (a) $ReSe_2$, (b) $ReSe_2$-rGO, (c) $ReSe_2$-N-rGO, and (d) $ReSe_2$-g-C_3N_4.