

Supplementary Information

A Photoactive Catalyst Ru-g-C₃N₄ for Hydrogen Transfer reaction of Aldehydes and Ketones†

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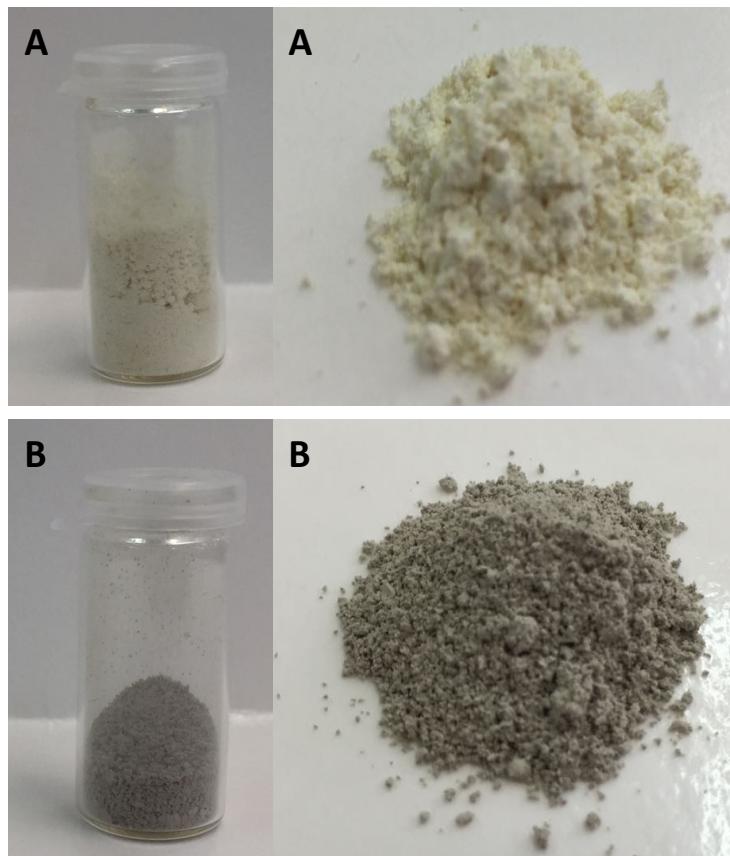


Figure S1: Physical appearance of (A) g-C₃N₄ and (B) Ru-g-C₃N₄



Figure S2 : Reaction Setup under Visible light (LED Lamp).

Figure: S3. XPS Quantification report of Ru-g-C₃N₄ material.

Sample 2 N3

Peak	Type	Position BE (eV)	FWHM (eV)	Raw Area (cps eV)	RSF	Atomic Mass	Atomic Conc %	Mass Conc %
O 1s	Reg	534.700	3.809	2817.3	0.780	15.999	7.53	7.81
N 1s	Reg	397.300	2.451	13402.2	0.477	14.007	59.46	54.00
Ru 3d	Reg	282.900	1.653	2383.6	4.273	101.069	1.17	7.68
C 1s	Reg	291.900	1.748	3713.0	0.278	12.011	28.07	21.86
Cl 2p	Reg	196.500	3.151	1589.4	0.891	35.460	3.76	8.65

Figure: S4(I). SEM-EDX images g-C₃N₄.

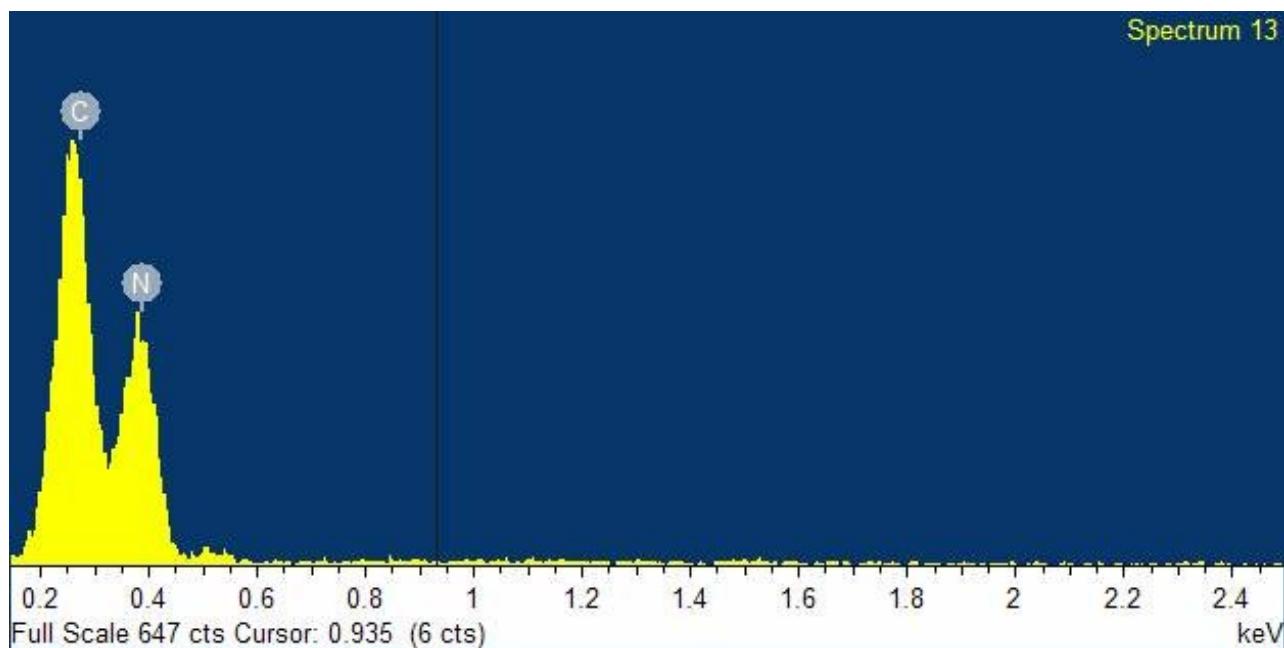


Figure: S4(II). SEM-EDX images Ru- g-C₃N₄.

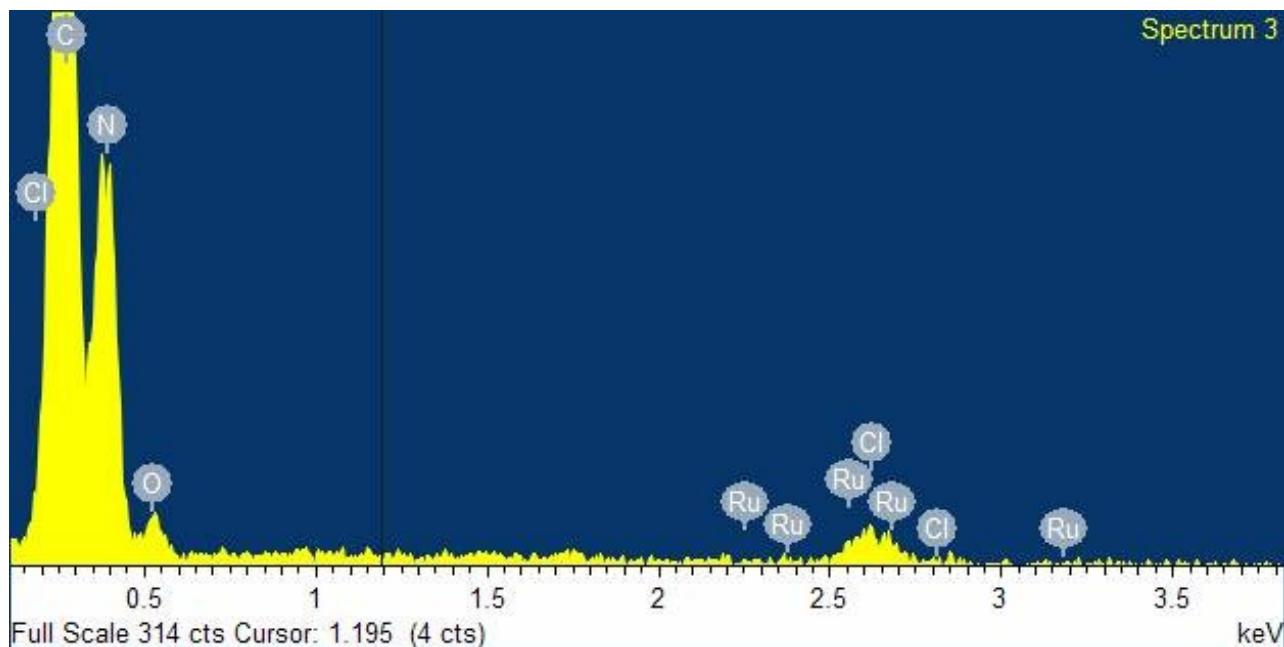


Figure S5: TEM analysis

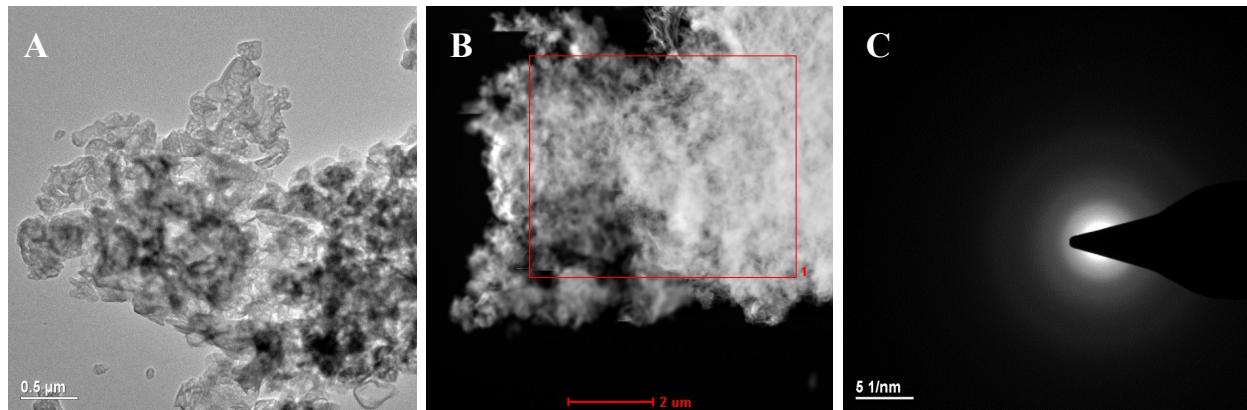


Figure S5(I): TEM images of $\text{g-C}_3\text{N}_4$ with different magnification (A) at $0.5\mu\text{m}$ scale, (B) at $1\mu\text{m}$ scale, (C) $\text{g-C}_3\text{N}_4$ SAED pattern.

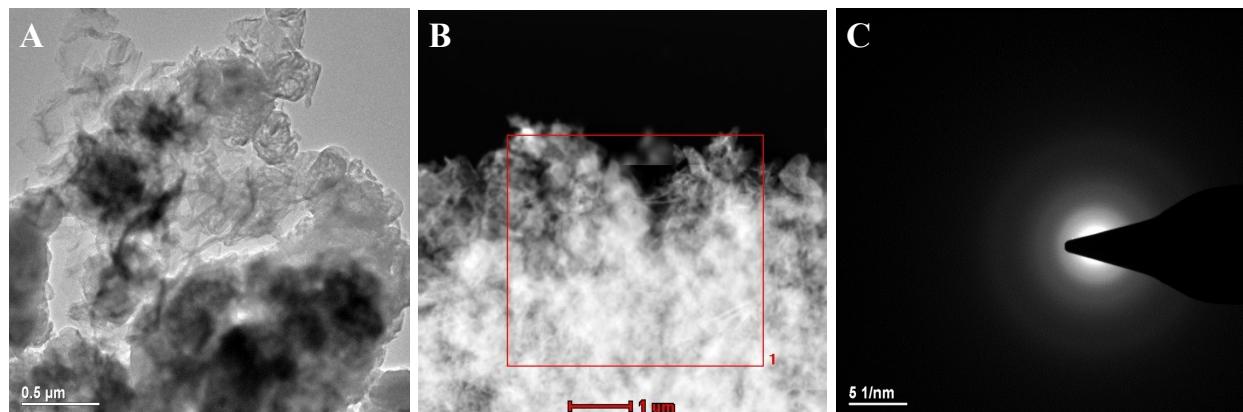


Figure:S5(II). TEM images of $\text{Ru-g-C}_3\text{N}_4$ with different magnification (A) at $0.5\mu\text{m}$ scale, (B) at $1\mu\text{m}$ scale, (C) $\text{Ru-g-C}_3\text{N}_4$ SAED pattern.

Figure: S6(I). TEM-EDX images of $\text{g-C}_3\text{N}_4$.

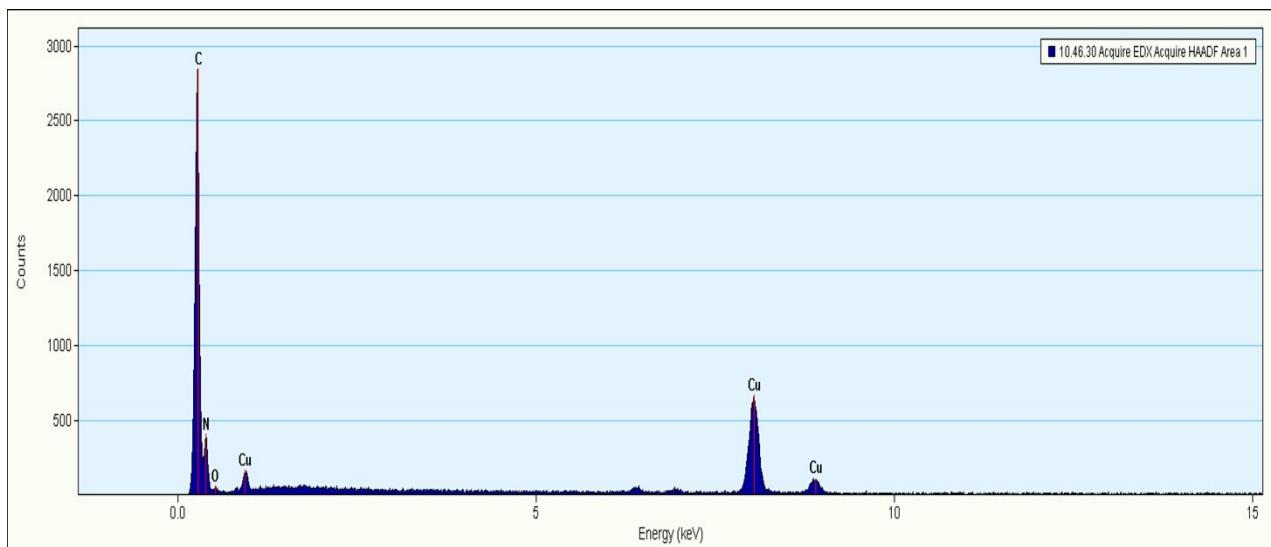


Figure: S6(II). TEM- EDX images Ru-g-C₃N₄.

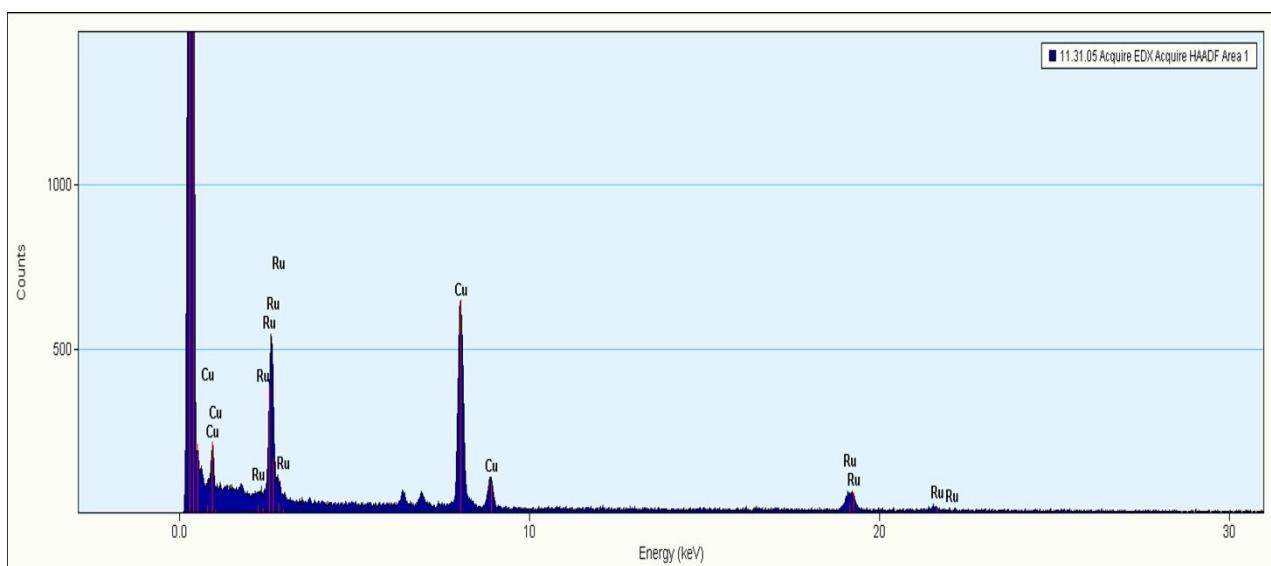


Figure: S7. BET surface area analysis



Figure: S7(I). Nitrogen adsorption-desorption isotherm (A) Ru-g-C₃N₄, (B) g-C₃N₄.

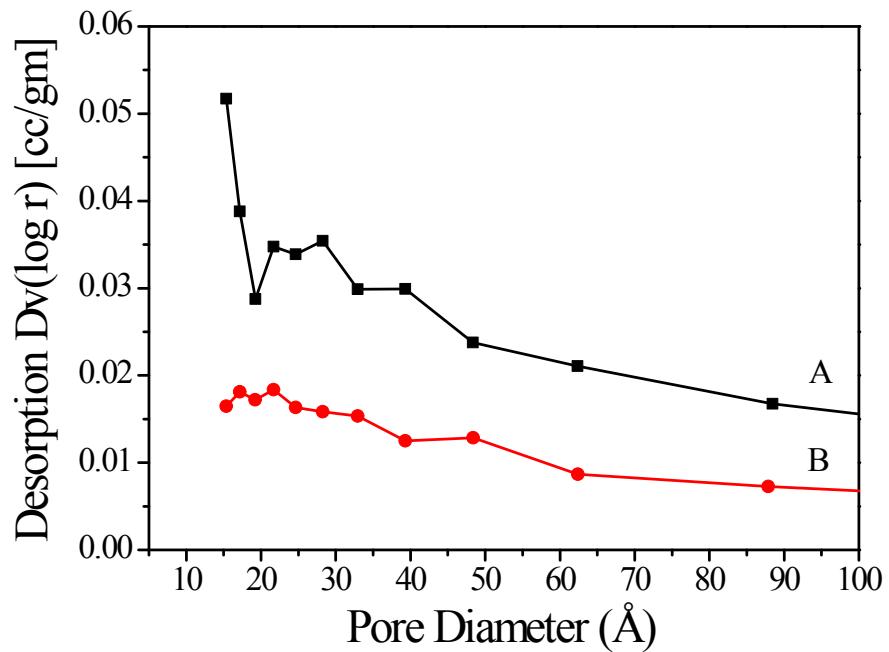


Figure: S7(II). Pore size distribution of (A) Ru-g-C₃N₄, (B) g-C₃N₄.

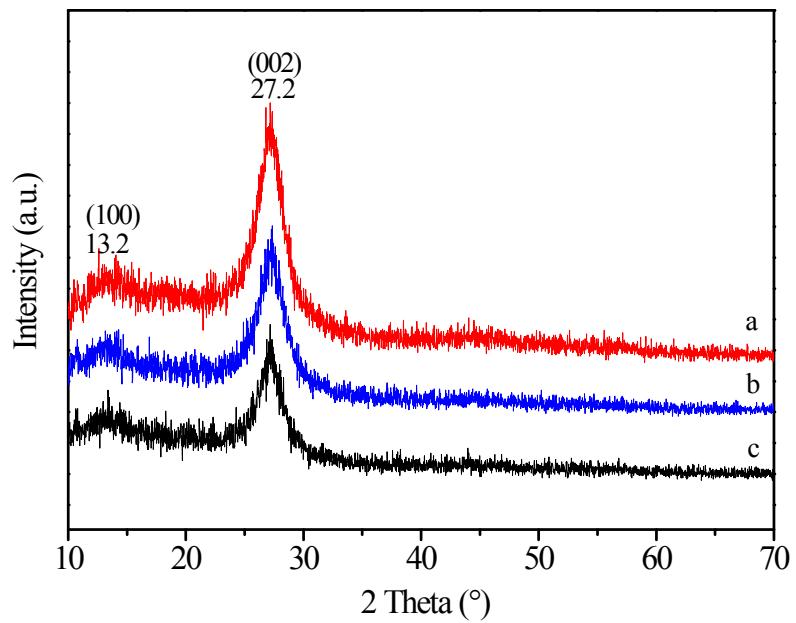


Figure: S8. XRD pattern of different loading (6, 8, 10 %) with ruthenium chloride (a) Ru-g- C_3N_4 (6), (b) Ru-g- C_3N_4 (8), (c) Ru-g- C_3N_4 (10).

Table S1: Reaction parameters (base, light, temperature g-C₃N₄) optimization for the hydrogen transfer reaction.

S. No.	Reaction condition	Time (h)	Yield (%)
1.	Dark + RuCl ₃	12	<2
2.	Light + RuCl ₃	12	<2
3.	Dark + KOH+ Ru	12	3
4.	Light + KOH + Ru	12	~7
5.	Dark + g-C ₃ N ₄	12	0
6.	Light + g-C ₃ N ₄	12	0
7.	Dark +Ru-g-C ₃ N ₄	24	<10
8.	Light +Ru-g-C ₃ N ₄	6	75
9.	No catalyst (blank reaction)	24	00

Reaction conditions: Ru-g-C₃N₄ (30 mg), Alcohol (5 mL), Carbonyl functional group (>C=O) (1 mmol), Isolated yields, visible light irradiation >420 nm (9 W LED domestic ceiling lamp), room temperature, Conversion and product yield based on GC area.