Electronic Supplementary Material (ESI) for Catalysis Science & Technology.

Supplementary information

Facile one-pot synthesis of mesoporous g-C_3N_4 nanosheets with simultaneous iodine doping and N-vacancies for efficient visible-light-driven H_2 evolution performance

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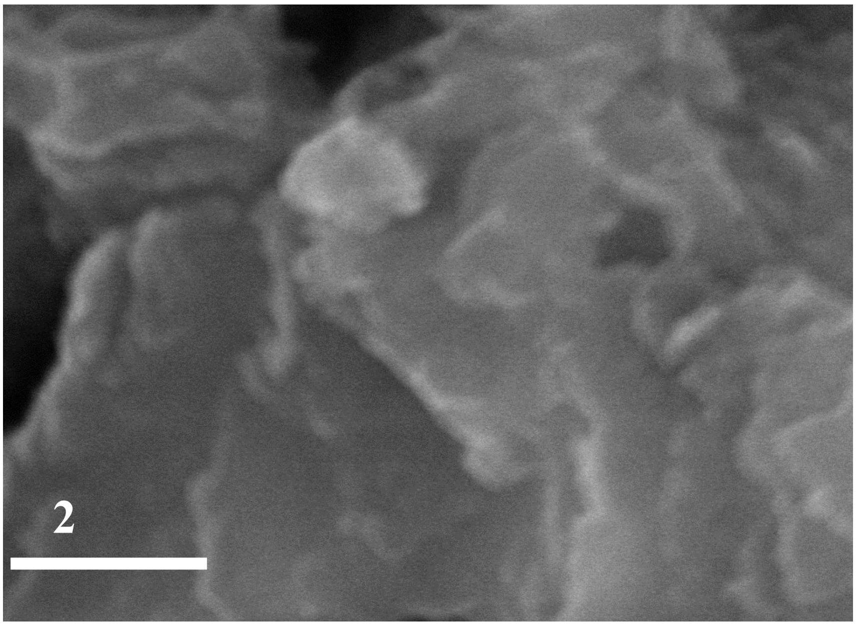

Fig.S1 SEM analysis of the bulk g-C_3N_4

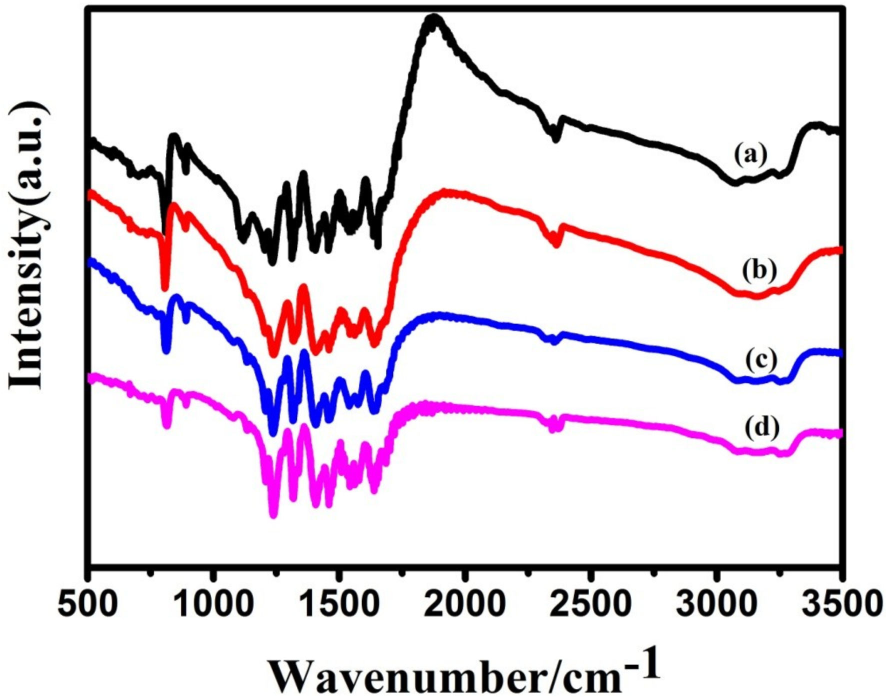

Fig.S2 FTIR spectra of (a) Bulk g-C_3N_4, (b) g-C_3N_4-GLC, (c) g-C_3N_4-NH_4I, (d)g-C_3N_4-GLC-NH_4I

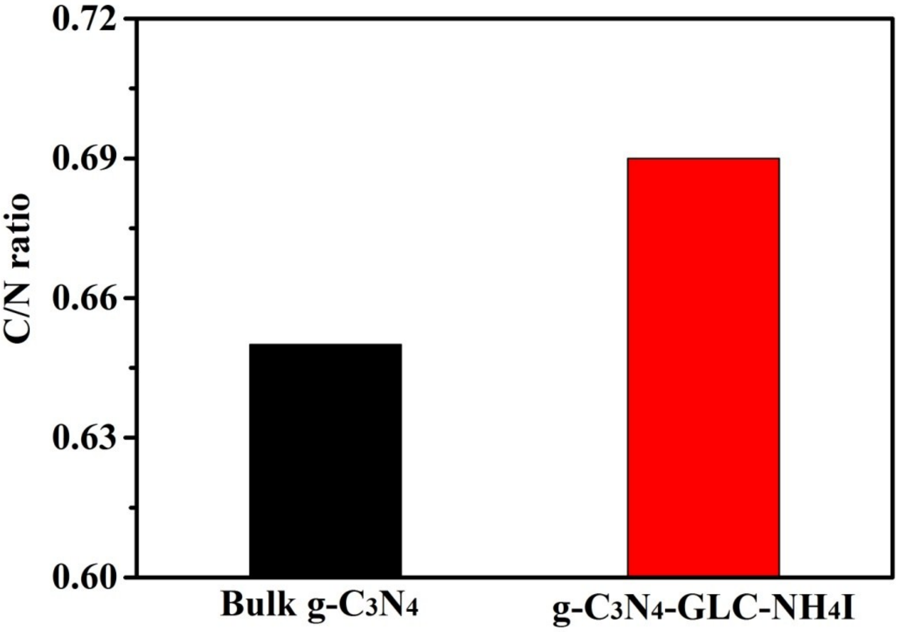

Fig.S3 C/N atomic ratio of bulk g-C_3N_4 and g-C_3N_4-GLC-NH_4I samples.

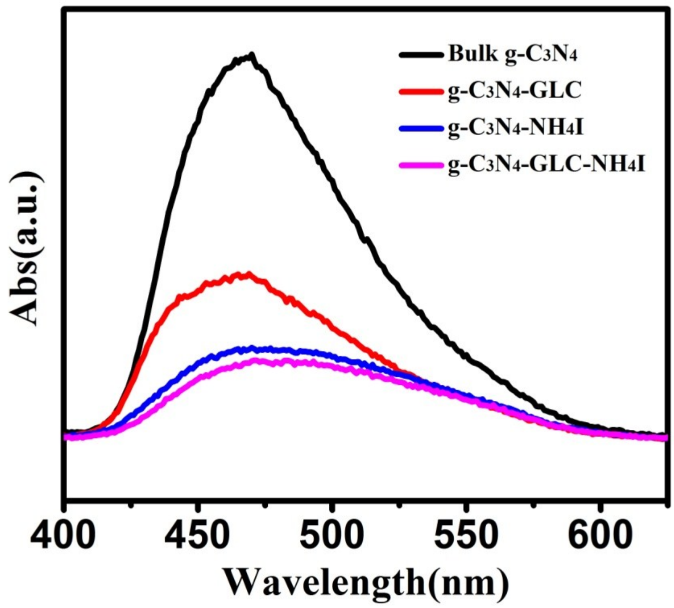

Fig.S4 Room-temperature PL spectra of g-C_3N_4, g-C_3N_4-GLC, g-C_3N_4-NH_4I, and g-C_3N_4-GLC-NH_4I

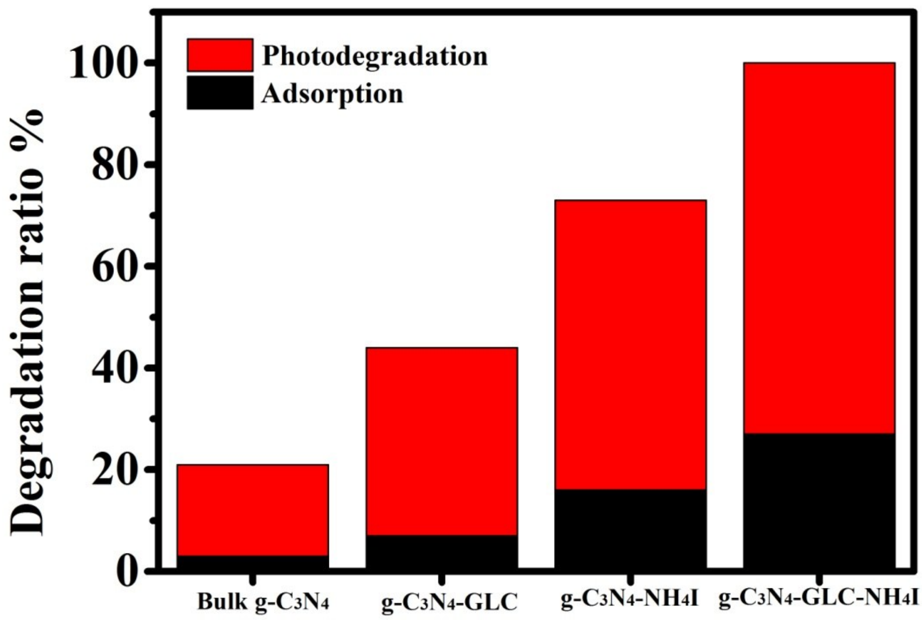

Fig.S5 Adsorption and photodegradation of RhB over different photocatalysts under simulated solar light irradiation.

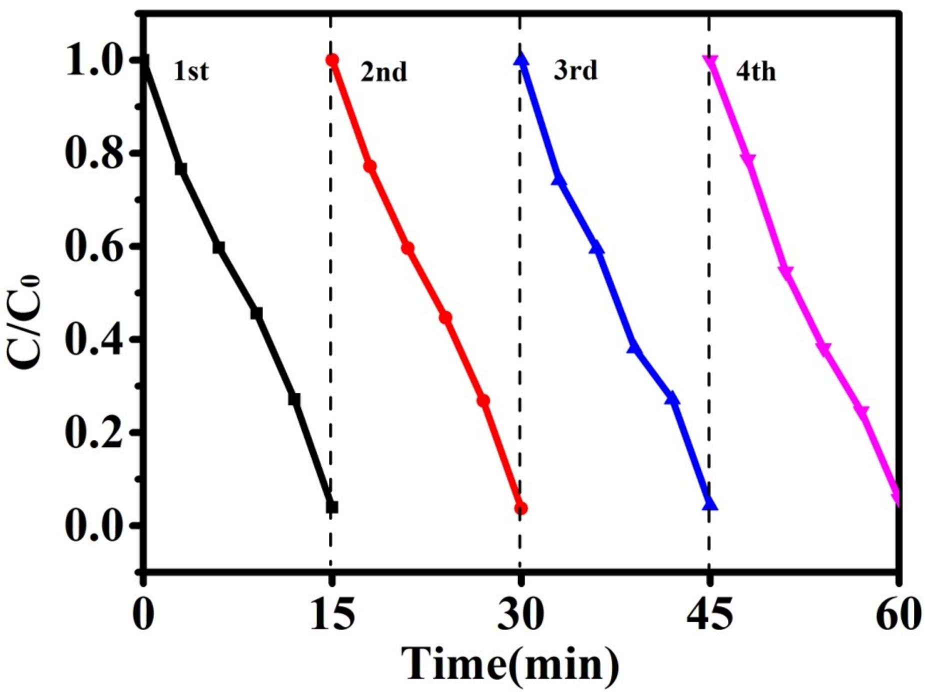

Fig.S6 Recycling test g-C_3N_4-GLC-NH_4I for the degradation of RhB sample under identical conditions.

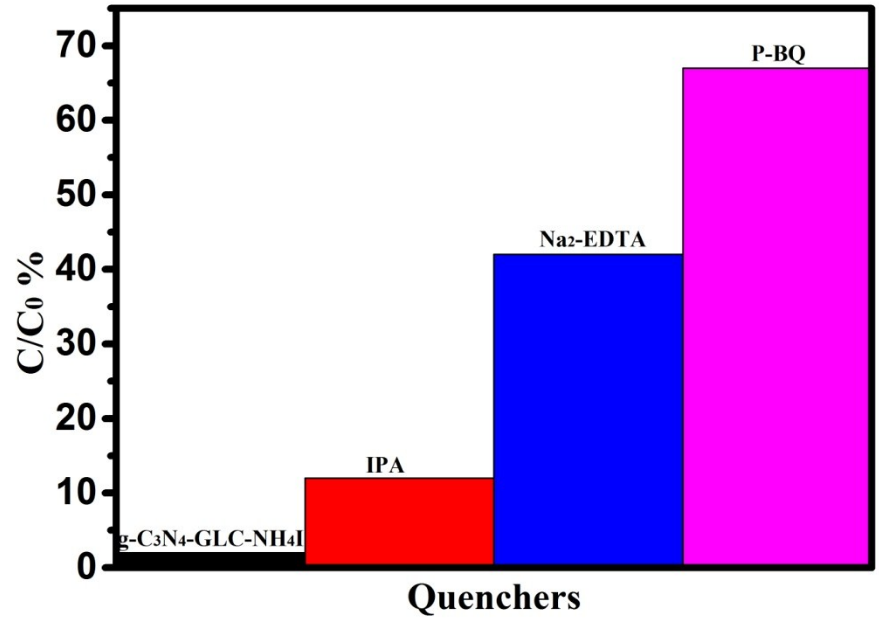

Fig.S7 Results of trapping species experiments performed for the photodegradation of RhB using IPA, Na_2-EDTA and P-BQ.

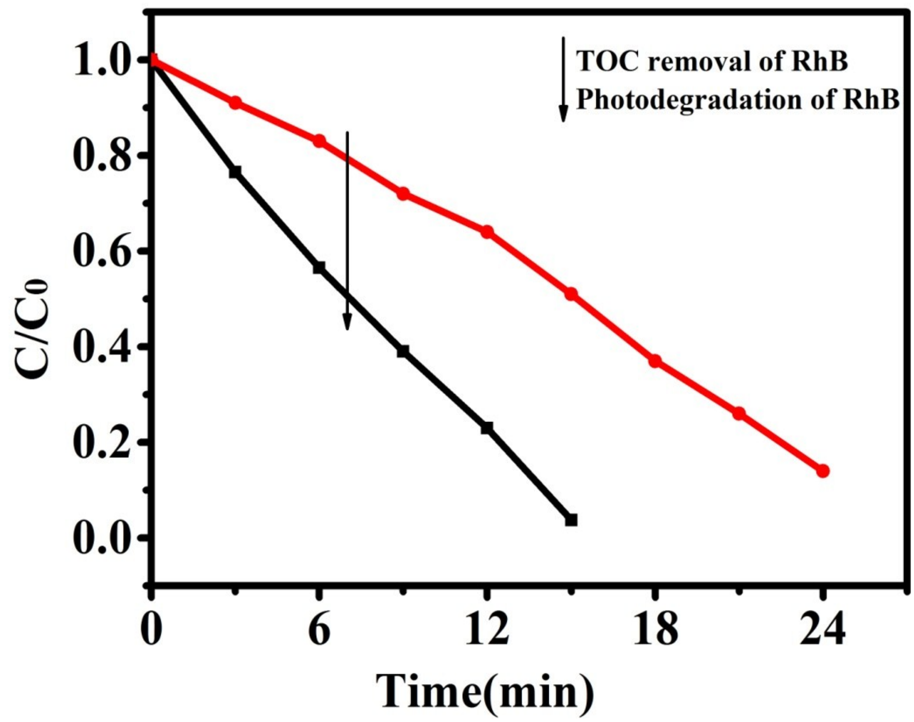

Fig.S8 The mineralization ability of g-C_3N_4-GLC-NH_4I photocatalyst for the RhB in terms of TOC removal.

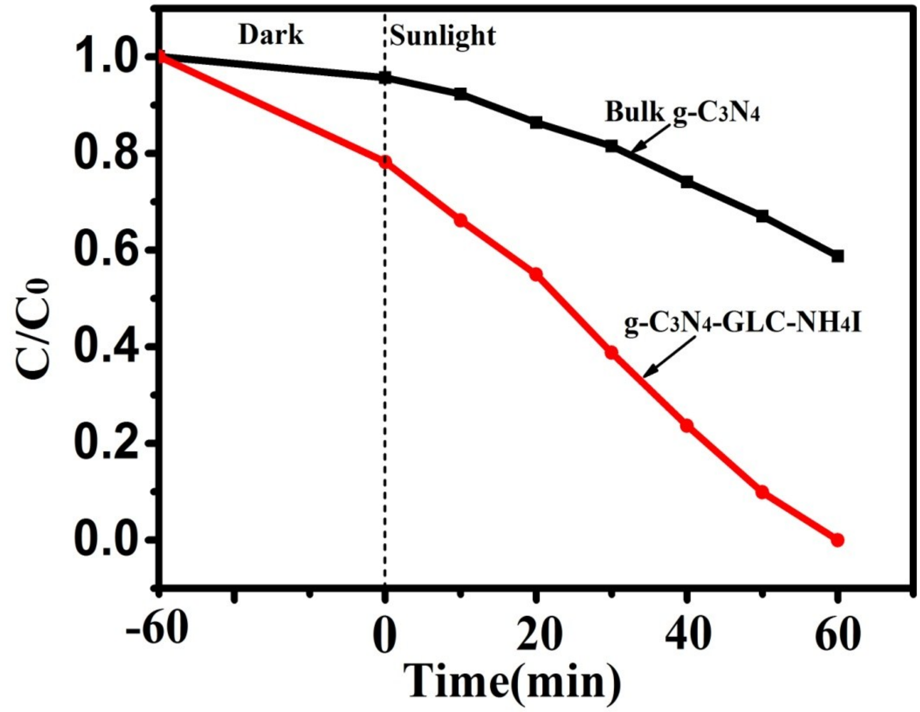

Fig.S9 Photodegradation of phenol under simulated solar light irradiation

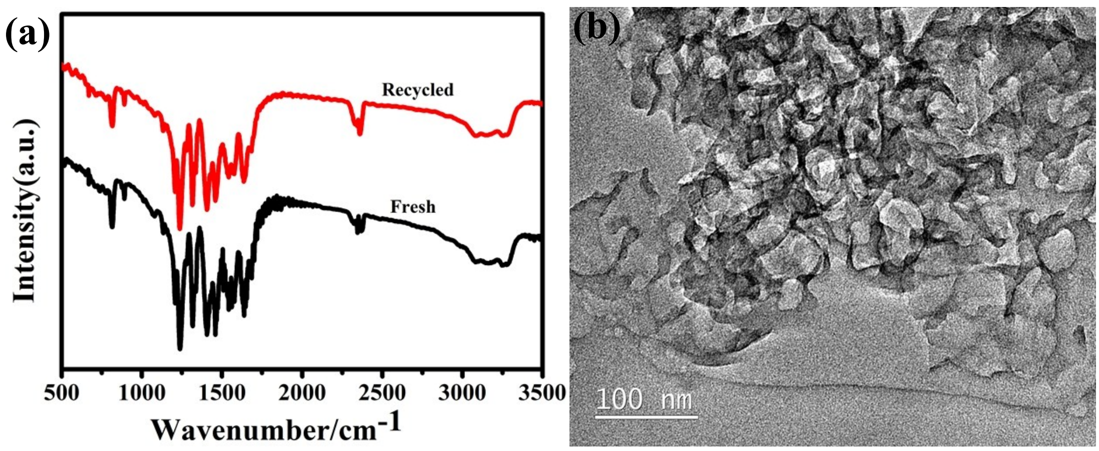

Fig.S10 (a) FT-IR patterns and; (b) TEM image of recycled photocatalyst ($g-C_3N_4$-GLC-NH_4I) after five continuous run of H_2 production.

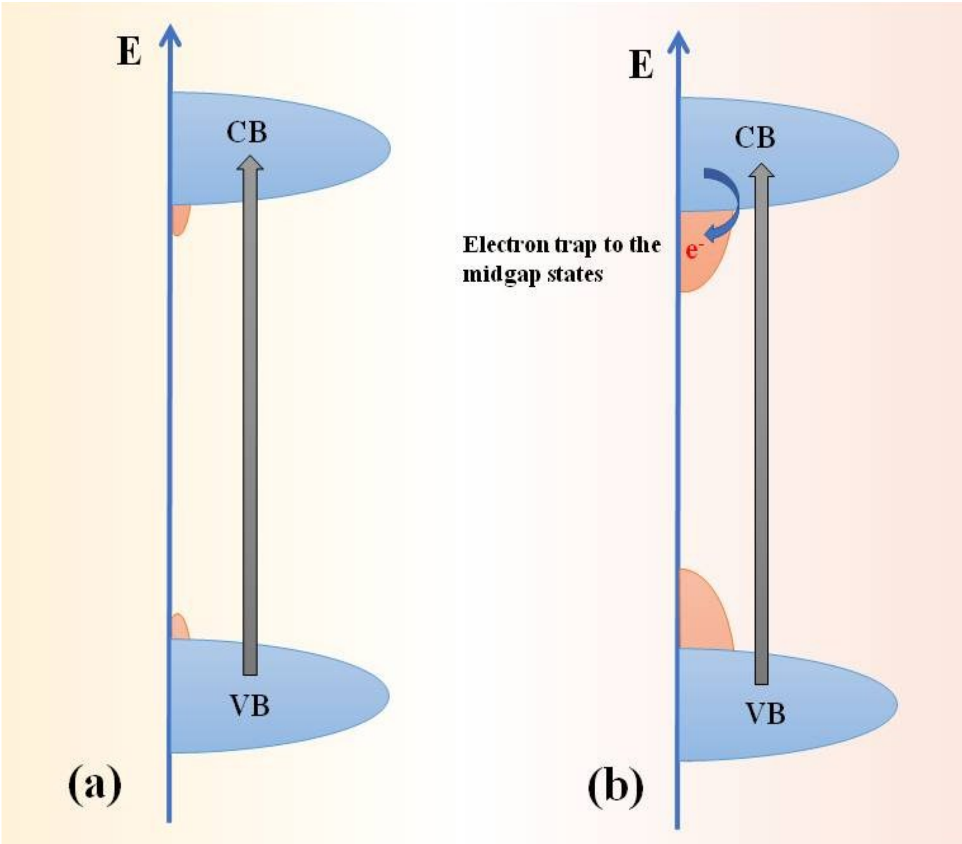

Fig.S11 Schematic of band structures of (**a**) bulk g-C_3N_4 with small band tail and midgap state due to low density of nitrogen vacancies and (**b**) gaseous bubbles assisted nanoporous g-C_3N_4 with large band tail and midgap state due to high density of nitrogen vacancies.

Table S1 Parameters obtained from N_2 adsorption-desorption isotherm measurement

Samples	S_{BET} (m^2 g^{-1})	Pore volume (cm^3 g^{-1})	Yield (%)
Bulk g-C_3N_4	16.53	0.129	46
g-C_3N_4-GLC	32.09	0.233	44
g-C_3N_4-NH_4I	44.29	0.329	40
g-C_3N_4-GLC-NH_4I	81.52	0.521	33

Table S2 Atomic concentrations for C and N elements of bulk g-C_3N_4 and g-C_3N_4-GLC-NH_4I derived from the XPS spectra.

Atomic (%)	C (at%)	N (at%)	C:N
Bulk g-C_3N_4	45.84	51.34	0.89
g-C_3N_4-GLC-NH_4I	47.73	49.78	0.96

Table S3 The performance comparison of the catalysts from the different references

Catalysts	Amount of photocatalyst (mg)	HER rate (μmol h^{-1})	HER rate (μmol h^{-1} g^{-1})	Preparation method	Ref.
Iodine doped N-vacant mesoporous g-C_3N_4	**50**	**390.96**	**7819.2**	**Thermolysis of Gaseous Templates**	**This work**
Iodine-dopd g-C_3N_4	50	38	760	Thermal condensation	Wang et al[1]
Iodine-doped g-C_3N_4 nanosheet	50	44.5	890	Ball milling method	Qu et al[2]
I-P codoped g-C_3N_4	100	93.9	939	Hydrothermal, thermal condensation	Jiang et al[3]
S-doped g-C_3N_4 microrod	20	100	5000	Supramolecular cocrystal	Zou et al[4]
B-doped g-C_3N_4	50	278	5560	Thermal polymerization	Wang et al[5]
P -Doped g-C_3N_4 nanosheets	50	79.8	1596	Thermal condensation	Qiao et al[6]
P-N bonded g-C_3N_4	30	54	1800	Post-thermal grafting approach	Li et al[7]

References

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