ĐẠI HỌC QUỐC GIA TP. HỒ CHÍ MINH
TRƯỜNG ĐH KHOA HỌC TỰ NHIÊN
KHOA KHOA HỌC VÀ CÔNG NGHỆ VẬT LIỆU

Chương 2
- Quang xúc tác dị thể
- Thiết kế thí nghiệm đo quang xúc tác

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Tp. Hồ Chí Minh, năm 2017

Nội dung

2.1 Các loại quang xúc tác dị thể

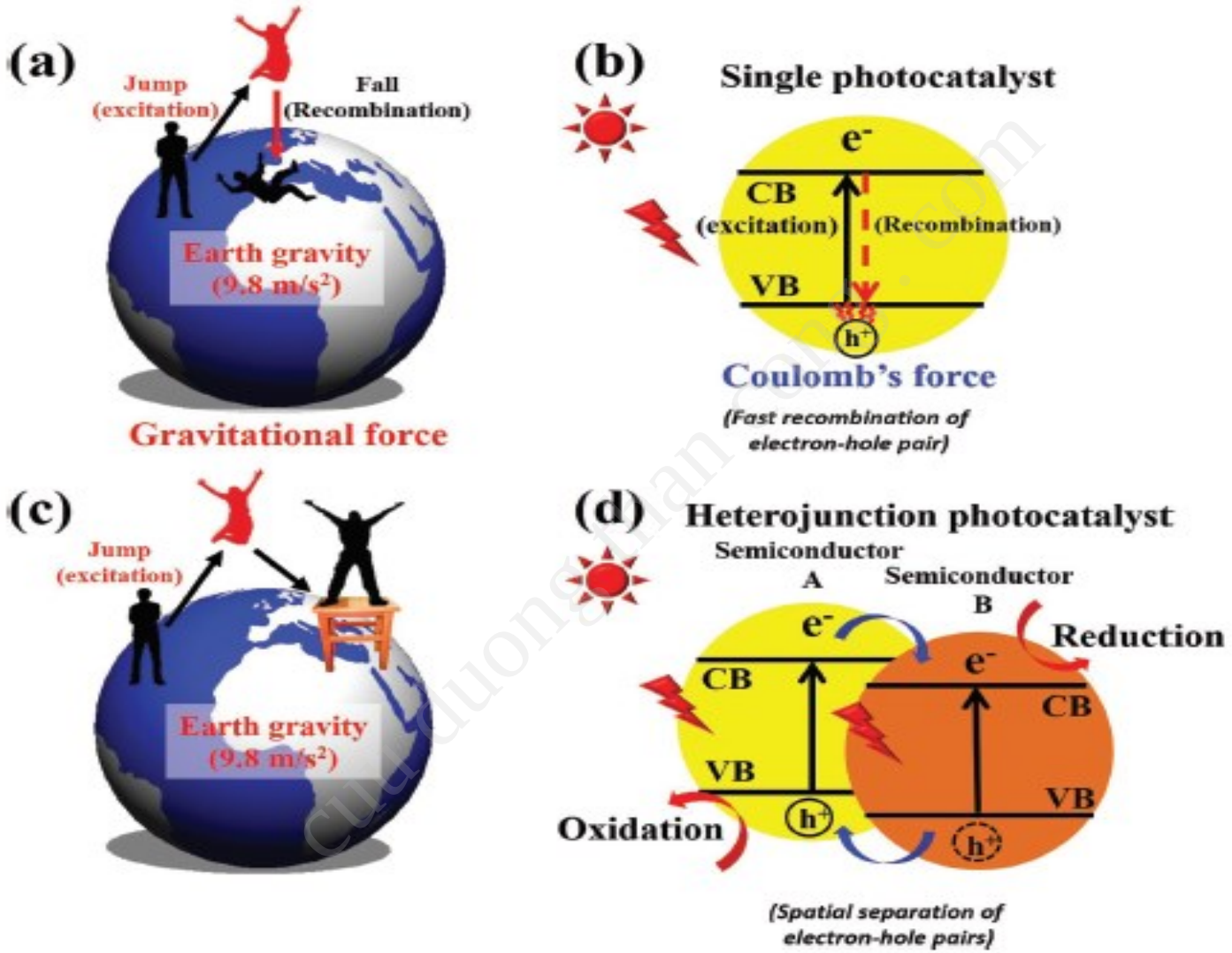
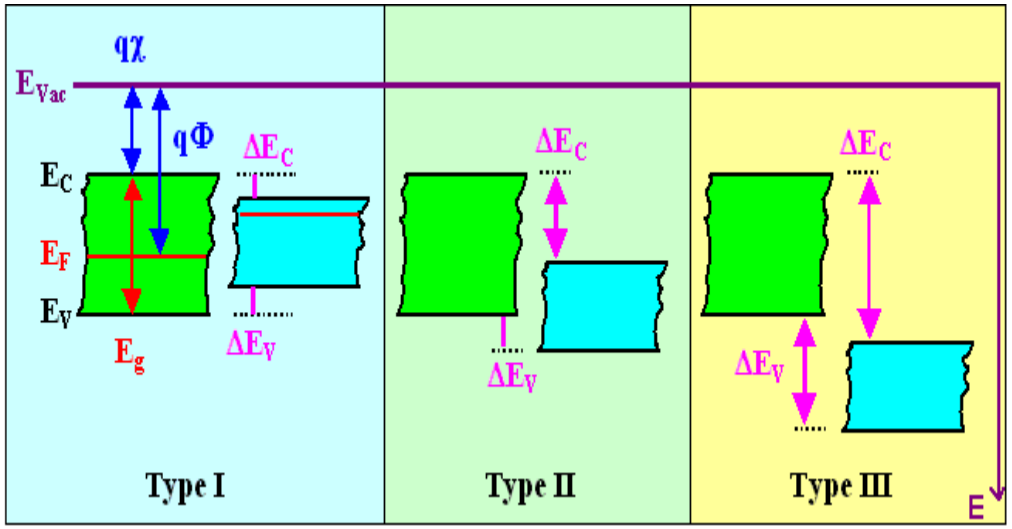
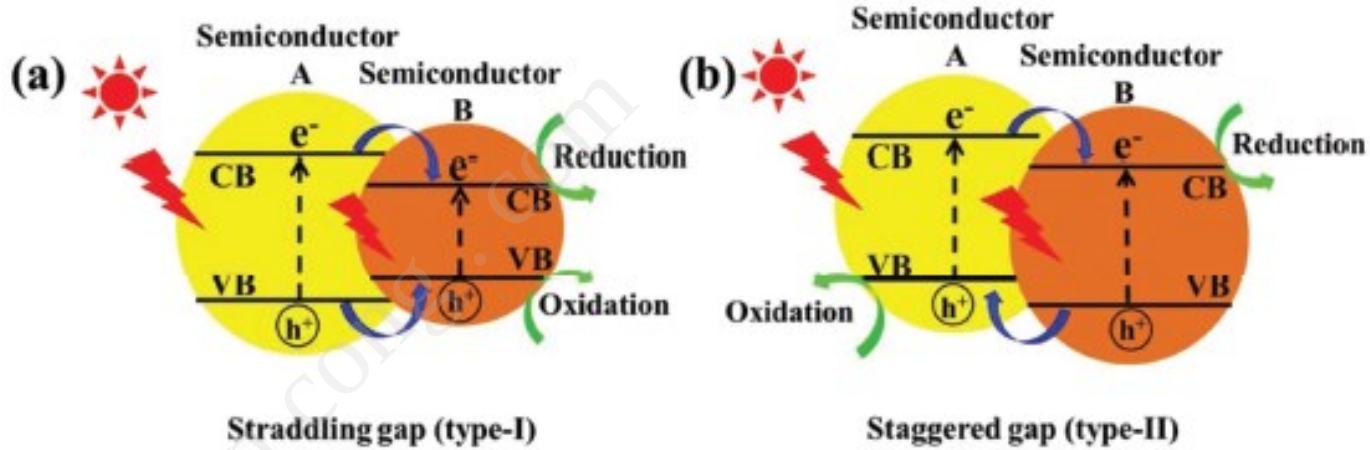
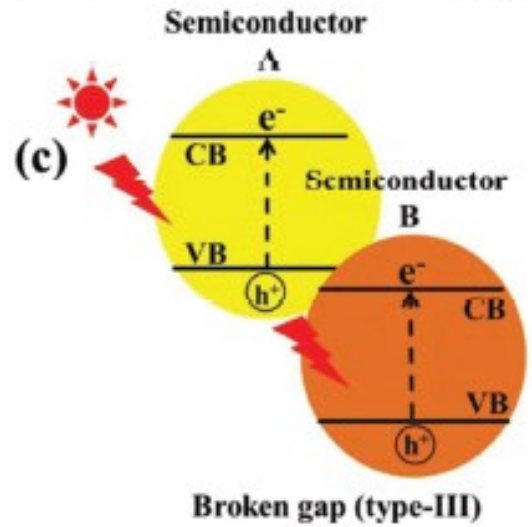


Figure 2. Schematic illustration of: a) the effect of gravitational force on a man who jumps off the ground, b) electron–hole recombination on a single photocatalyst, c) use of a stool to keep a man off the ground, and d) electron–hole separation on a heterojunction photocatalyst.

Các loại cấu trúc tiếp giáp dị thể bán dẫn







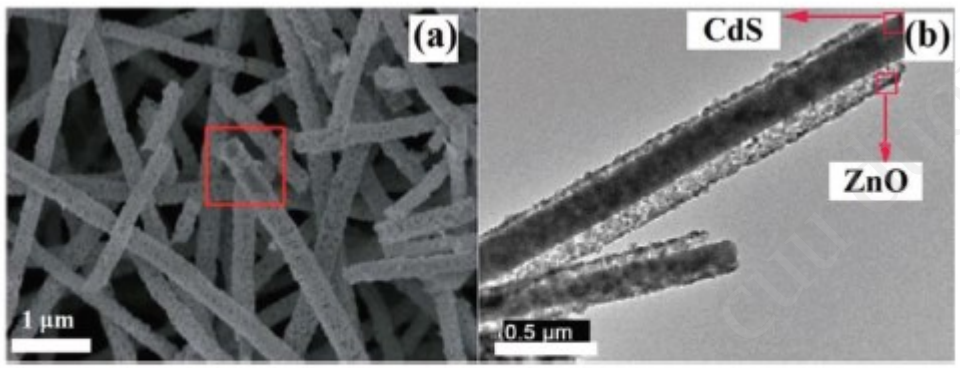


Figure 5. a,b) Scanning electron microscopy (SEM) (a) and transmission electron microscopy (TEM) (b) images of CdS/ZnO core/shell nanofibers with a type-II heterojunction. Reproduced with permission.[10] Copyright 2013, The Royal Society of Chemistry.

p–n Heterojunctions

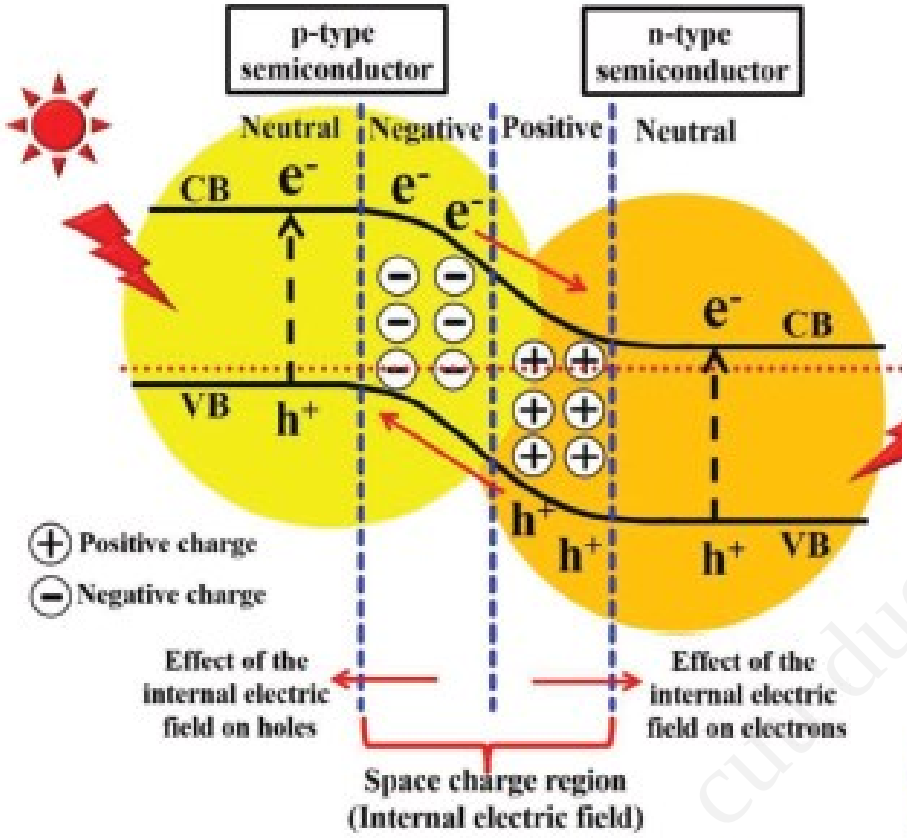


Figure 8. Schematic illustration of the electron–hole separation under the influence of the internal electric field of a p–n heterojunction photocatalyst under light irradiation.

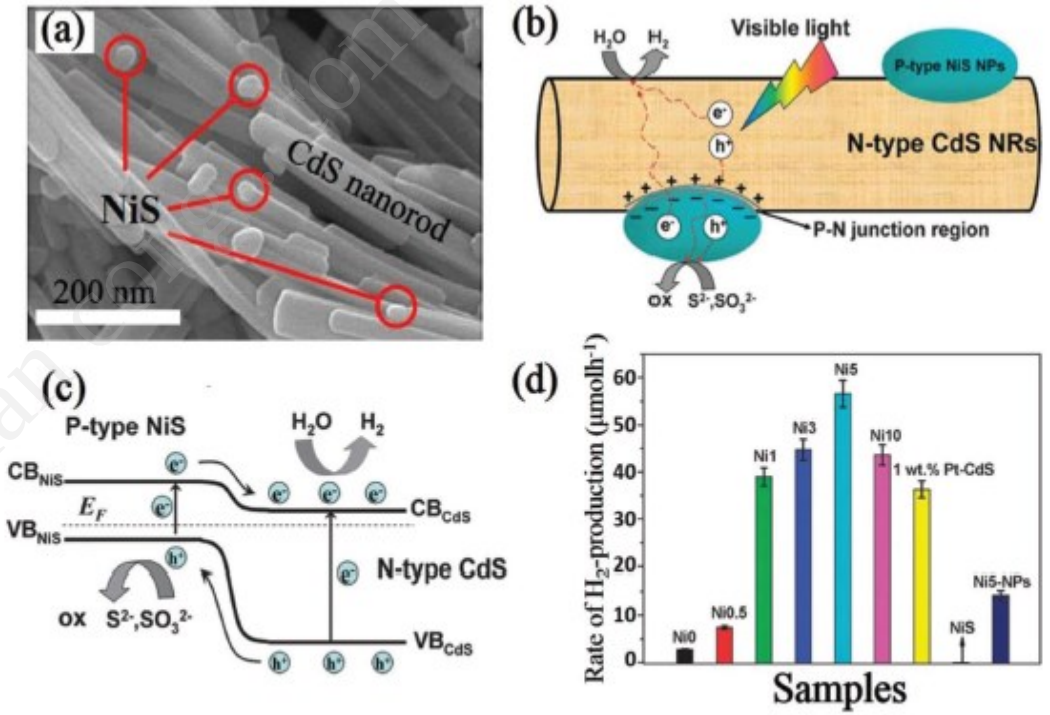
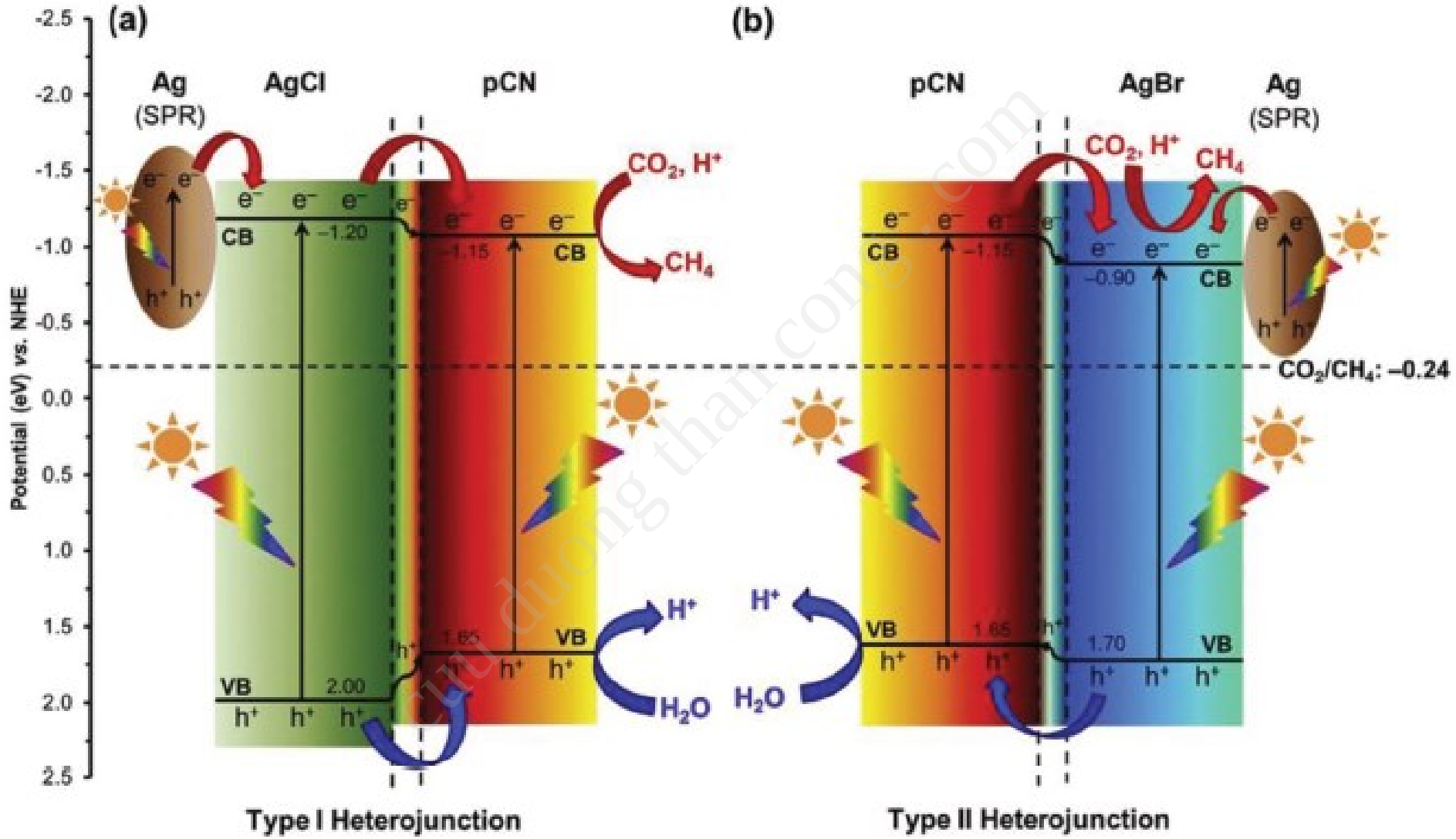


Figure 9. a) SEM image of 5 wt% NiS-loaded CdS. b,c) Schematic illustration of the charge-carrier separation on the NiS/CdS nanorods with p–n heterojunctions (b) and across the NiS/CdS p–n heterojunction (c). d) Comparison of the photocatalytic activity of CdS with different NiS loadings: Ni0 (0 wt% NiS), Ni0.5 (0.5 wt% NiS), Ni1 (1 wt% NiS), Ni3 (3 wt% NiS), Ni5 (5 wt% NiS), Ni10 (10 wt% NiS), 1 wt% Pt–CdS, and pure NiS under visible-light irradiation. Reproduced with permission.[29] Copyright 2013, The Royal Society of Chemistry.



Direct Z-Scheme Heterojunctions

$$A + e^- \rightarrow D \quad (3)$$

$$D + h^+ \rightarrow A \quad (4)$$

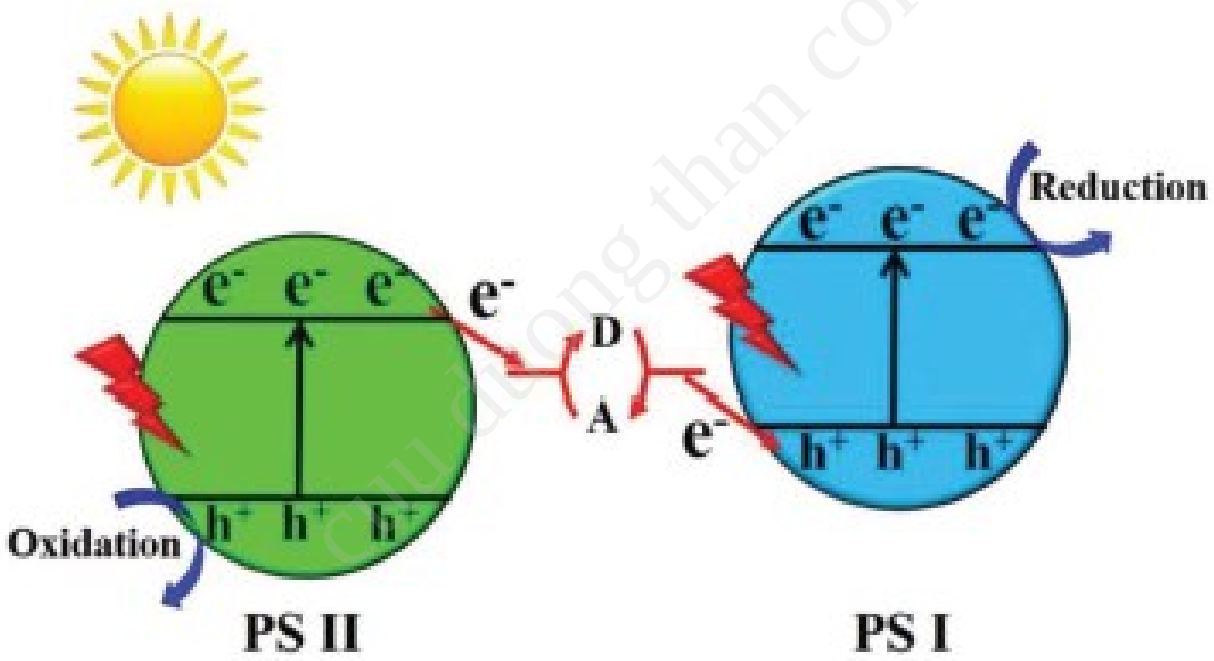


Figure 14. Schematic illustration of electron–hole separation on the conventional Z-scheme photocatalytic system under light irradiation.

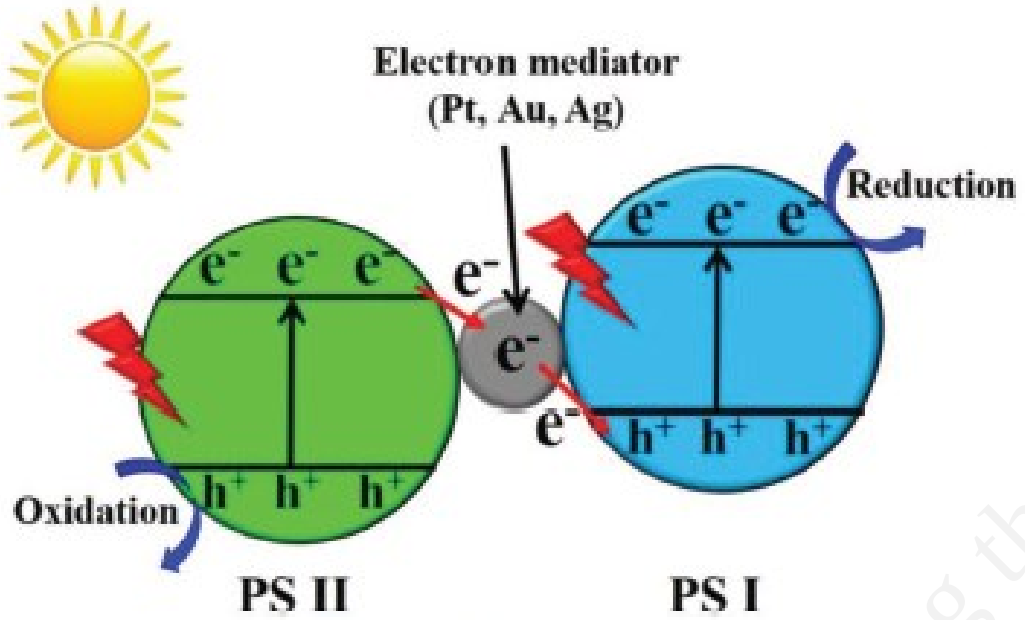


Figure 15. Schematic illustration of the electron–hole separation on all-solid-state Z-scheme photocatalysts under light irradiation.

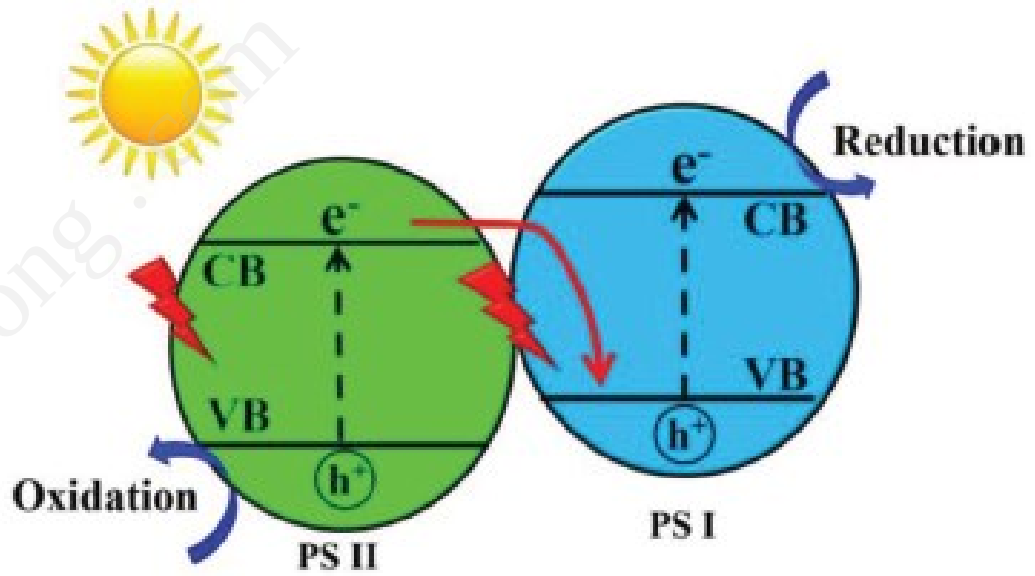
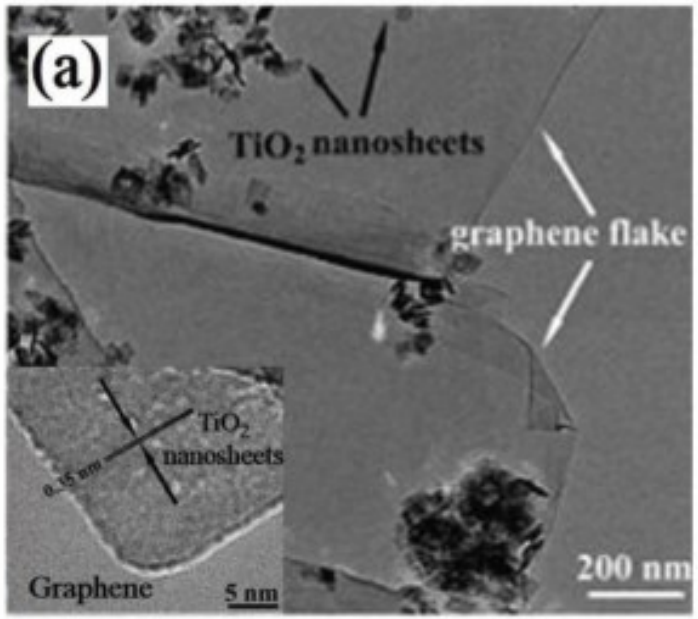
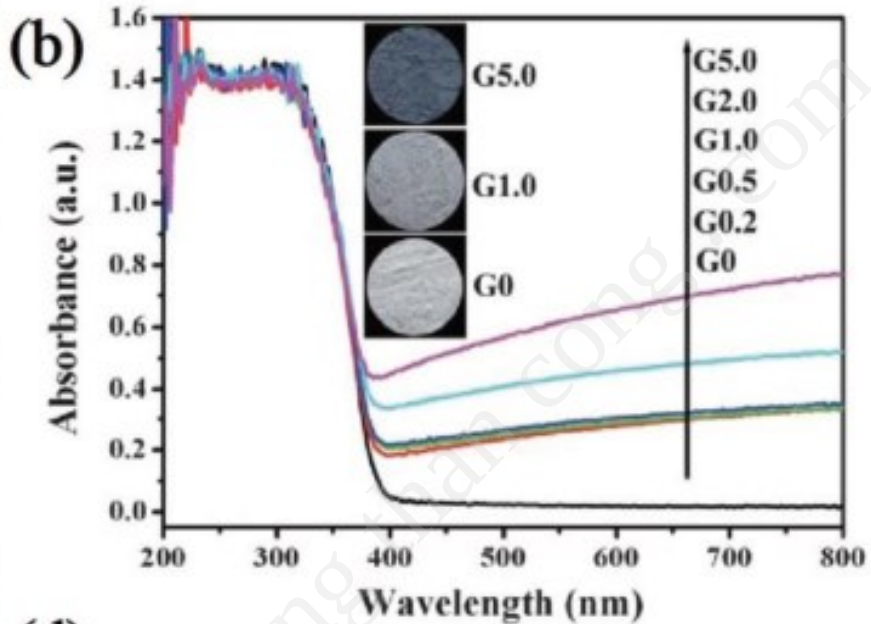
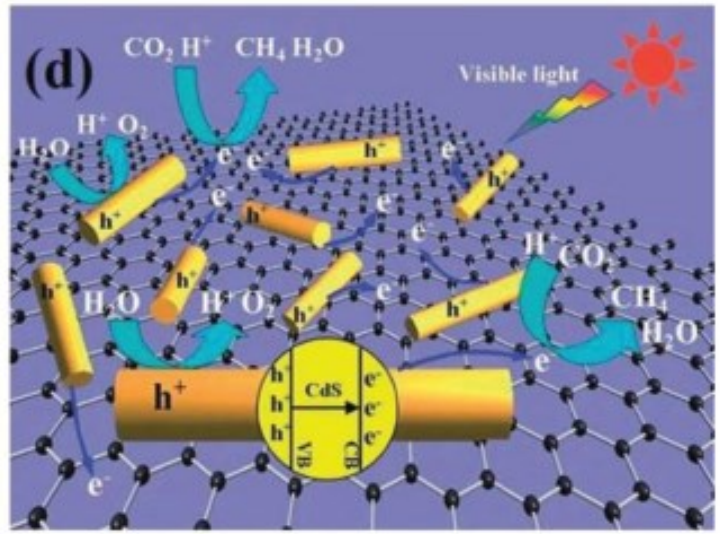


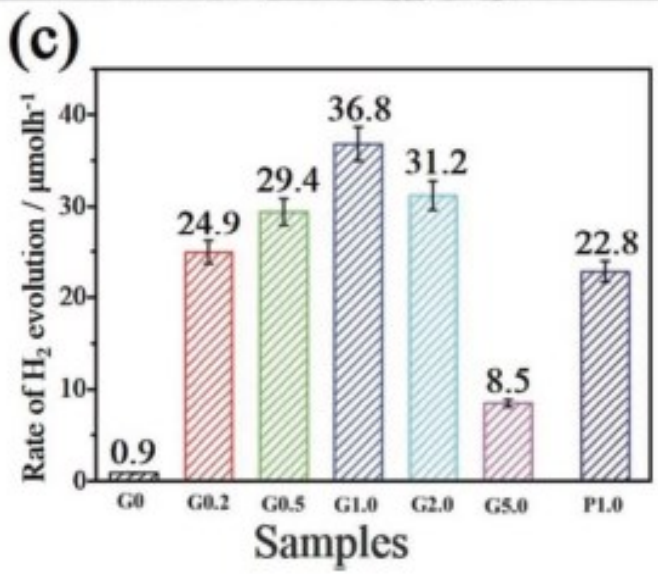
Figure 16. Schematic illustration of electron–hole separation on a direct Z-scheme heterojunction photocatalyst under light irradiation.

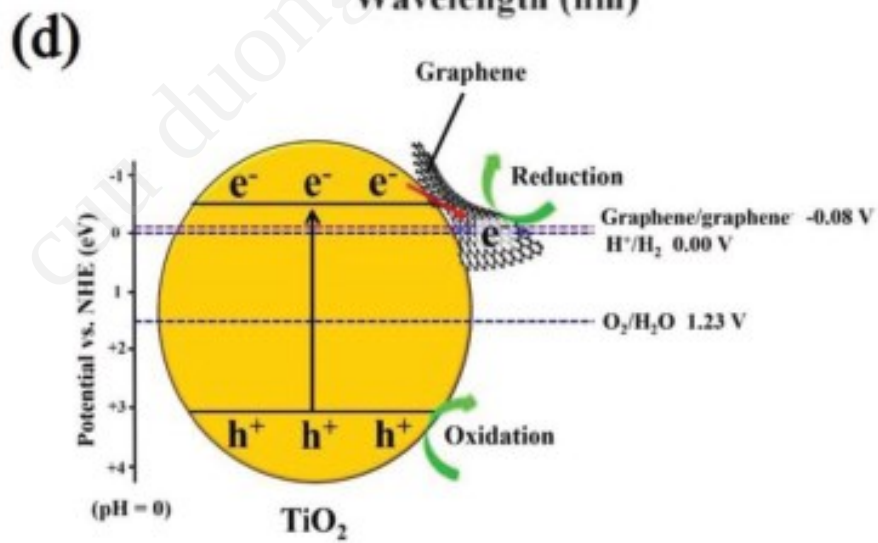
Semiconductor/Graphene Heterojunctions











2.2 Thiết kế các thí nghiệm đo quang xúc tác

2.2.1 Quang xúc tác xử lý nước

2.2 Thiết kế các thí nghiệm đo quang xúc tác

2.2.1 Quang xúc tác xử lý nước

Synthesis of Ag nanoparticles loaded on TiO2 nanotubes by photoreduction method

2.2 Thiết kế các thí nghiệm đo quang xúc tác

2.2.1 Quang xúc tác xử lý nước

2.2.2 Quang xúc tác xử lý khí

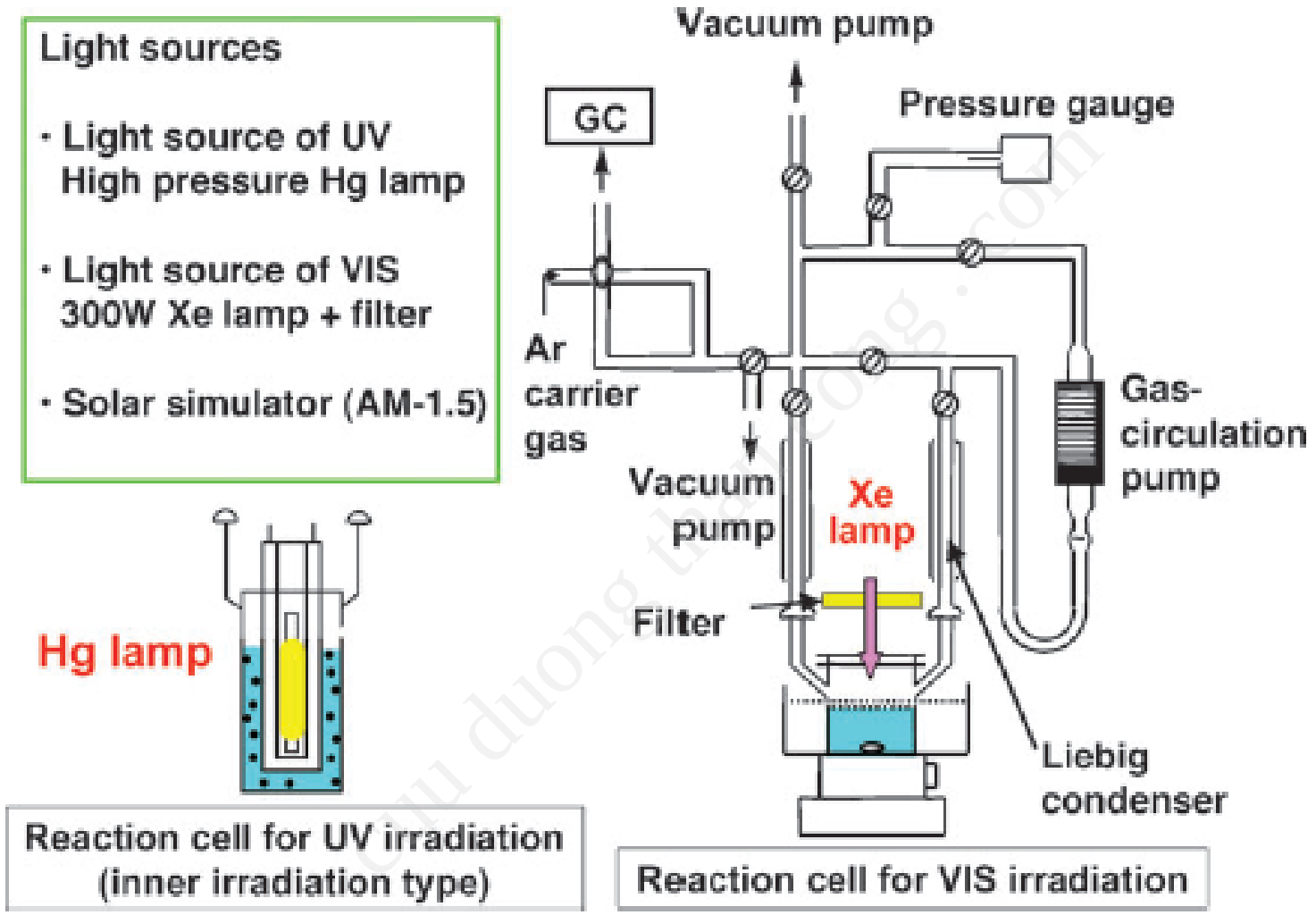
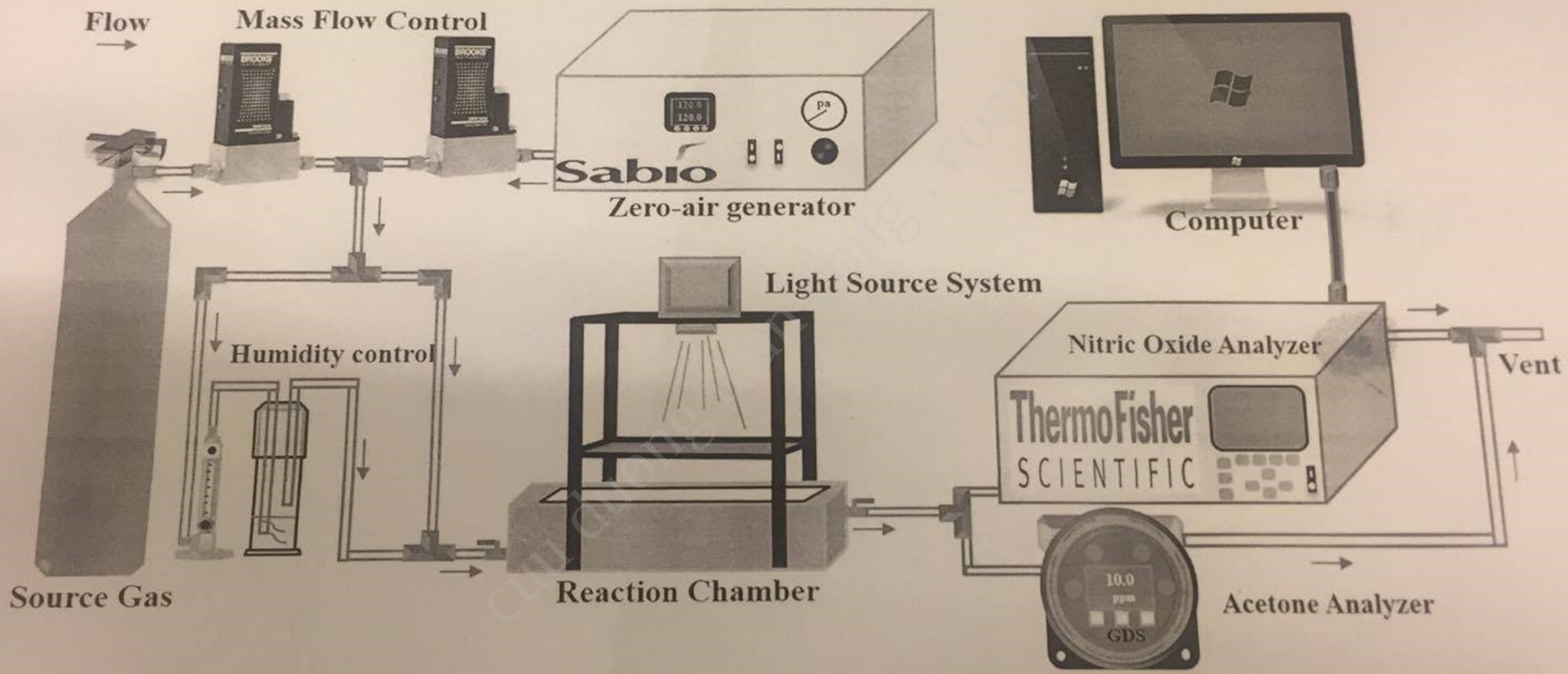


Fig. 11 An example of the experimental setup for photocatalytic water splitting.



用光催化系統，開機步驟(關系統倒著步驟)

開總電源，確	開啟零氣裝置，	開 MFC 控制器，	開啟儀器熱機	檢查反應艙	檢查鋼平接閥是	等待氣體平衡後	紀錄時間
儀器通電正常	溫度到達 110 時	輸出零氣，檢查	30 分鐘(直到報	有無污損雜質	否漏氣，通入鋼	開啟燈源之風扇	反應並開

The end!