Efficient and eco-friendly mechanical milling preparation of anatase/rutile TiO_2-Glucose composite with energy gap enhancement

- **Imane Ellouzi [1,*] and Hicham Abou Oualid [2,*]**

- [1] Faculty of Sciences, Rabat, Morocco; im.ellouzi@gmail.com
- [2] Faculty of Sciences and Technologies, Mohamedia, Morocco; hicham.abououalid@gmail.com

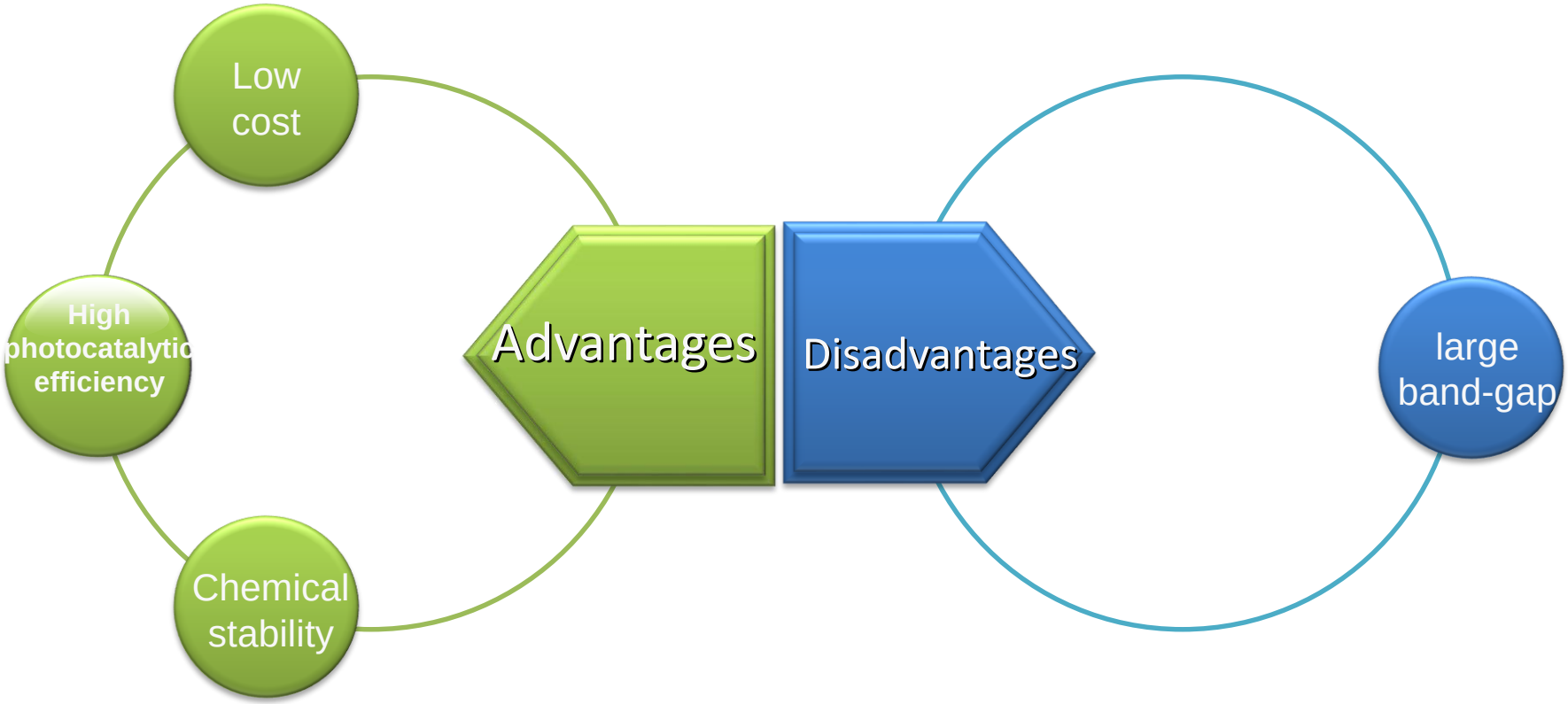
Ball milling

Relatively low installation cost

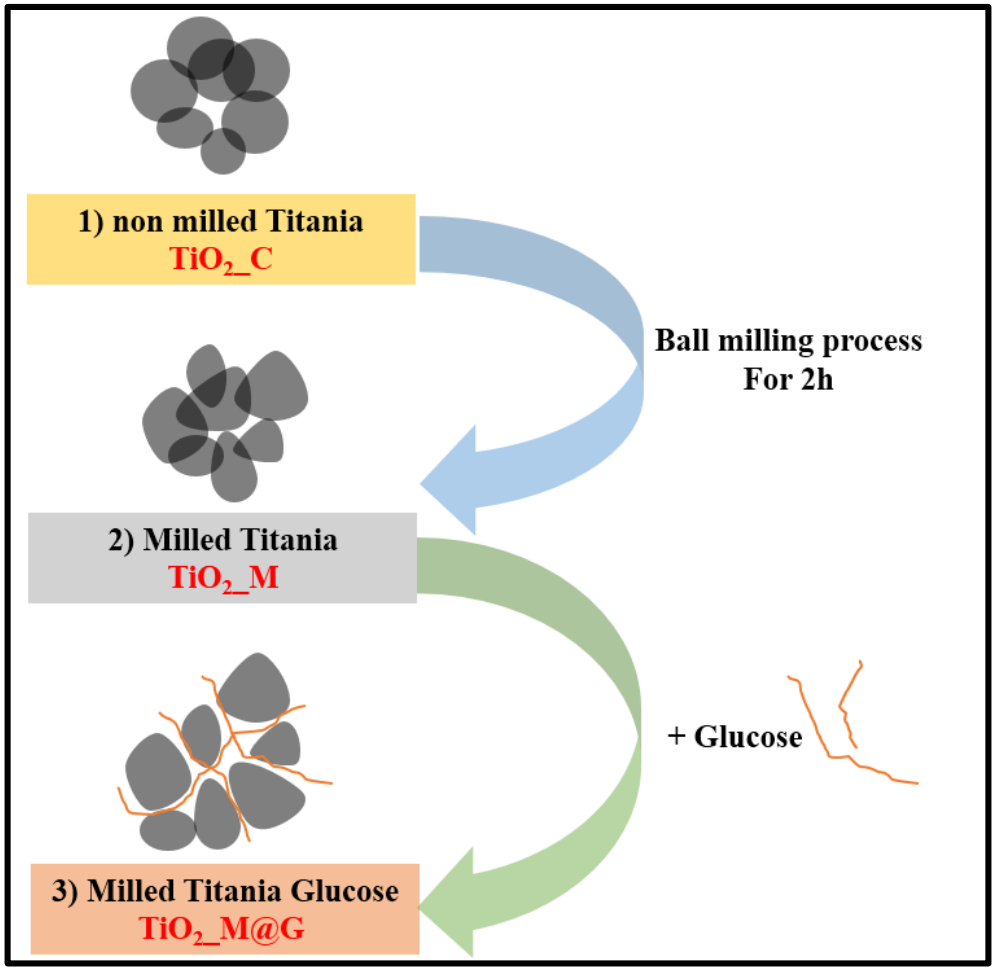
Capability to treat materials of all hardness degrees

Large number of particles can be easily obtained by solely grinding bulk materials in a milling vessel with milling balls

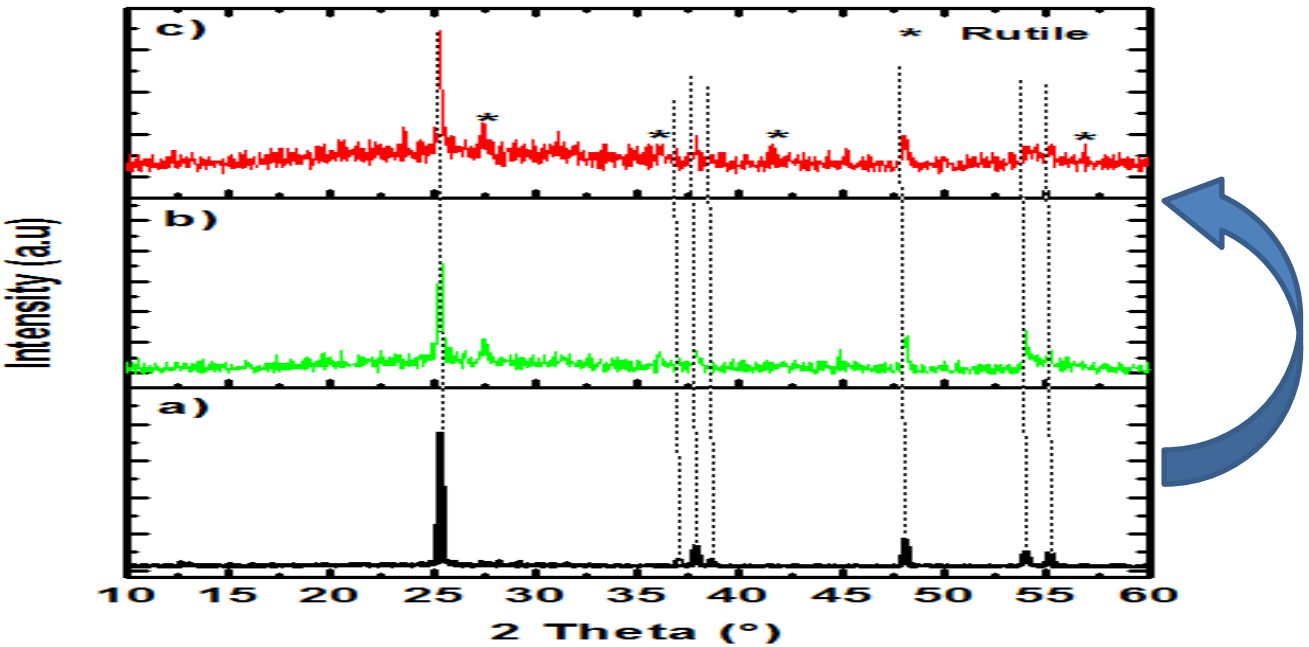
Advantages and disadvantages of TiO_2



Synthesis of composite materials

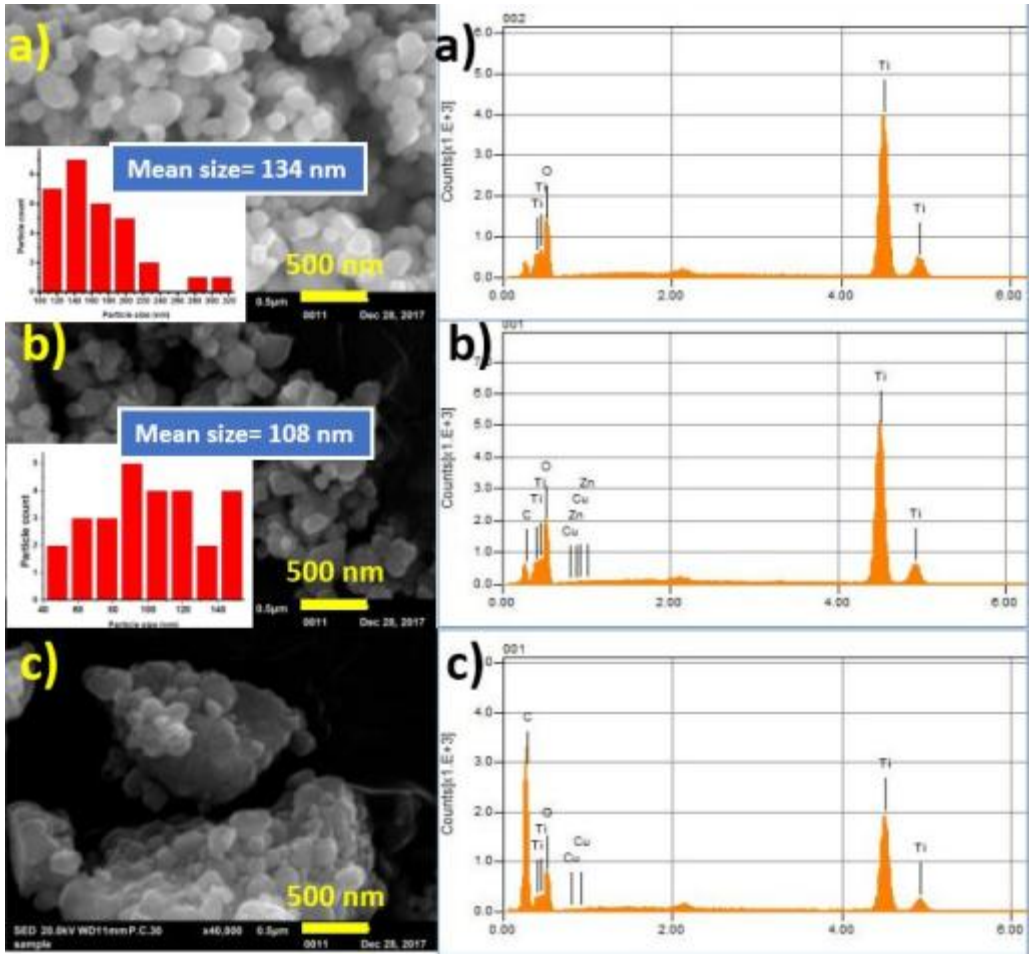


X Ray Diffraction

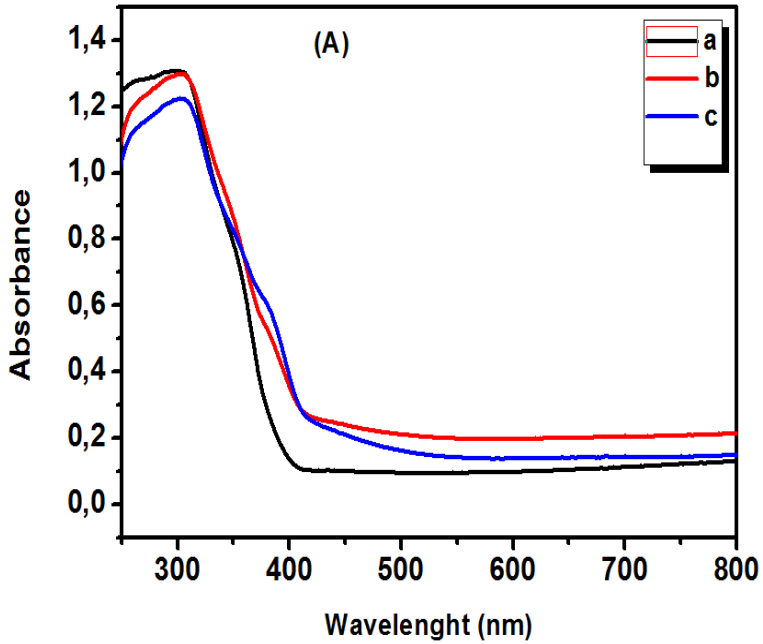


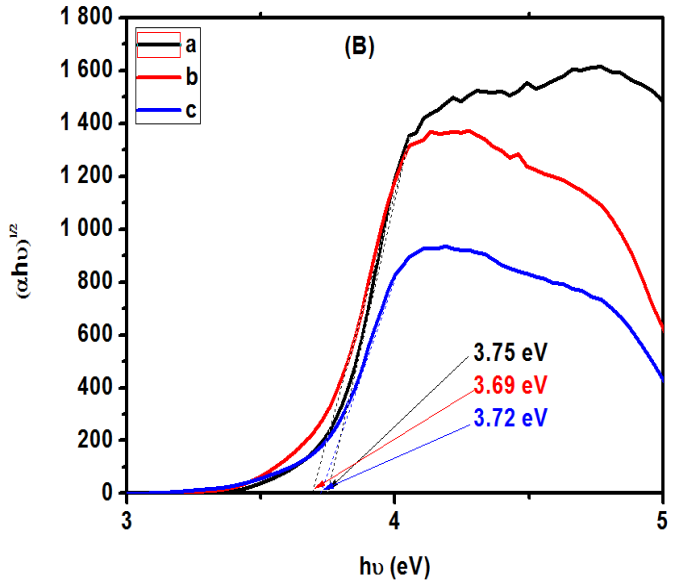
Milling ➔ Phase transformation from anatase to rutile

SEM images


a)
Mean size= 134 nm
500 nm
b)
Mean size= 108 nm
500 nm
c)
500 nm
a)
b)
c)
Counts[x1 E+3]
Ti
O
C
Zn
Cu

UV-visible diffuse reflectance spectroscopy (DRS)





Conclusions

- Cost effective and ecofriendly method was applied to prepare composites containing anatase-rutile TiO_2 and anatase-rutile TiO_2-glucose.

- Anatase/rutile TiO_2 composite and anatase/rutile TiO_2@glucose composite using high energy ball milling process were prepared.
- A decrease in particle size, phase transformation of TiO_2 partially from anatase to rutile and the absorption in the visible light .