

Supporting information for the article:

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Supporting Information

Synthesis of CaO–SiO₂ compounds and their testing as heterogeneous catalysts for transesterification of sunflower oil

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The UV–vis diffuse reflectance (DRS) spectra of the samples calcined at 700 and 900 °C along with starting CaO and SiO₂ powders used for the synthesis are displayed in Fig. 1S. The direct band gap energy, E_g , can be calculated using Tauc relation [S2]

$$(F \cdot hv)^2 = A (hv - E_g) \quad (S1)$$

where F is the Kubelka–Munk function [S2], h – Planck's constant, A – a proportionality constant, hv – the photon energy, and E_g – the band gap energy. Band gap values were derived by plotting $(F \cdot hv)^2$ against hv and extrapolating straight line of the linear part to the hv intercept.

Tauc plots are presented in Figs. 2S–8S. The derived band gap energies are given in Table 1

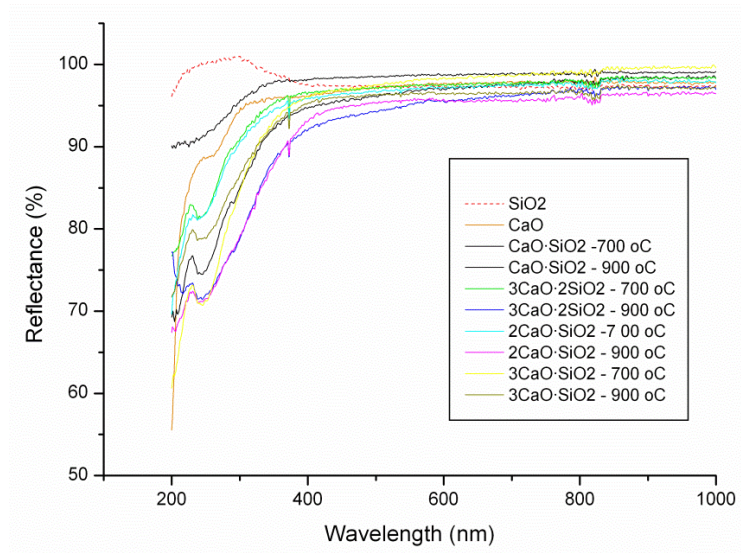


Fig. 1S. UV-vis diffuse reflectance spectra of CaO-SiO₂ system.

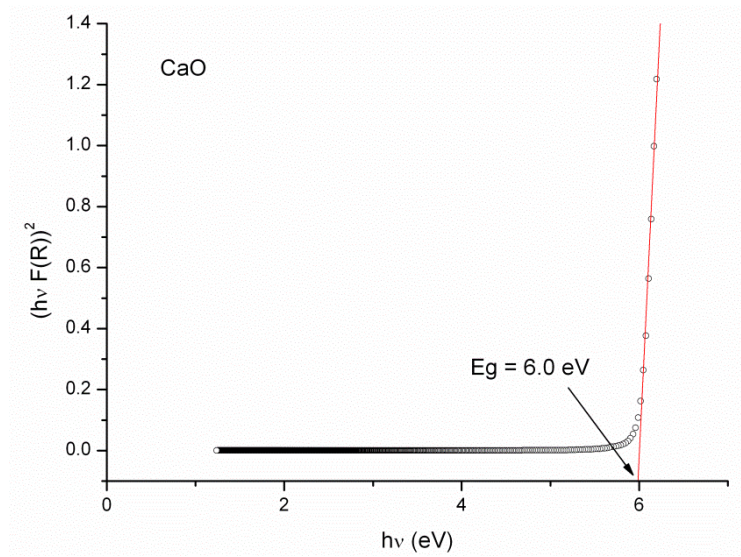


Fig. 2S. Kubelka-Munk transformed reflectance spectra (Tauc plot) of CaO.

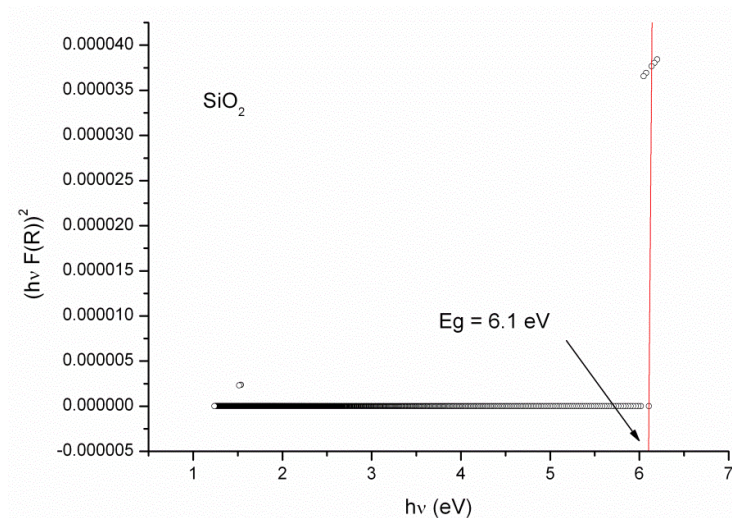


Fig. 3S. Kubelka-Munk transformed reflectance spectra (Tauc plot) of SiO₂.

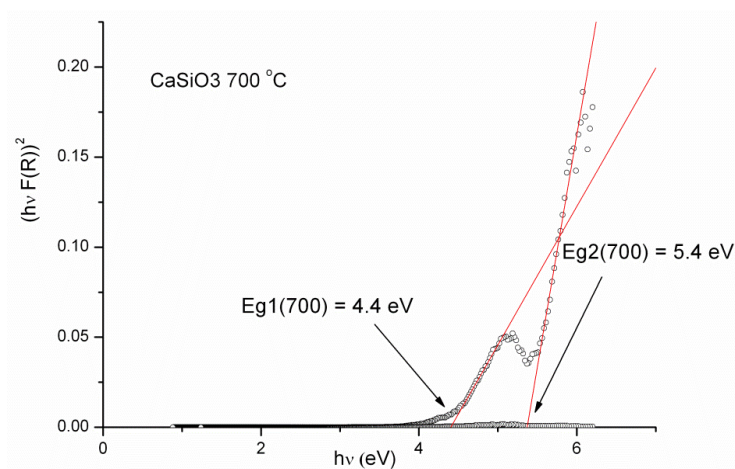


Fig. 4S. Kubelka-Munk transformed reflectance spectra (Tauc plot) of CaO-SiO₂ calcined at 700 °C/2 h.

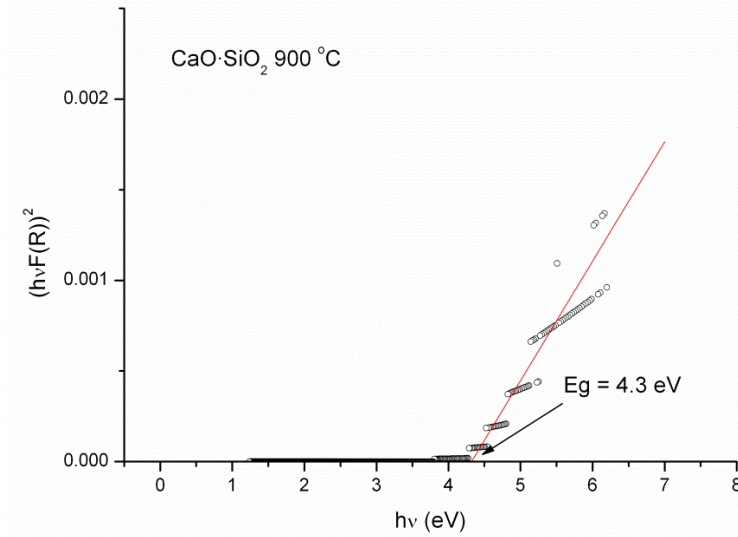


Fig. 5S. Kubelka-Munk transformed reflectance spectra (Tauc plot) of CaO·SiO₂ calcined at 900 °C/48 h.

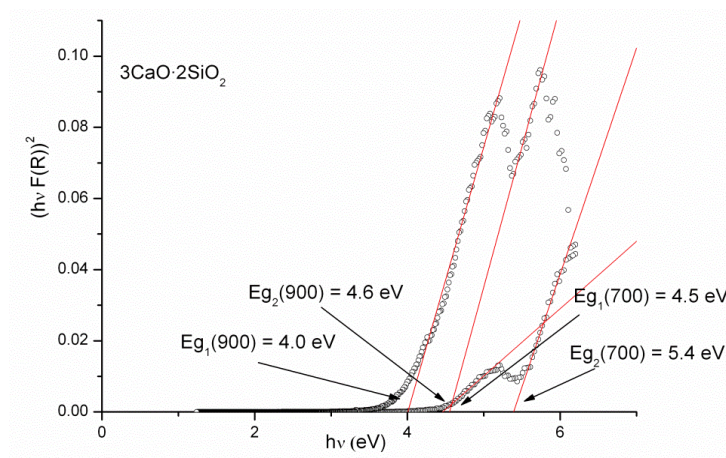


Fig. 6S. Kubelka-Munk transformed reflectance spectra (Tauc plot) of 3CaO·2SiO₂ calcined at 700 °C/2 h and 900 °C/48 h.

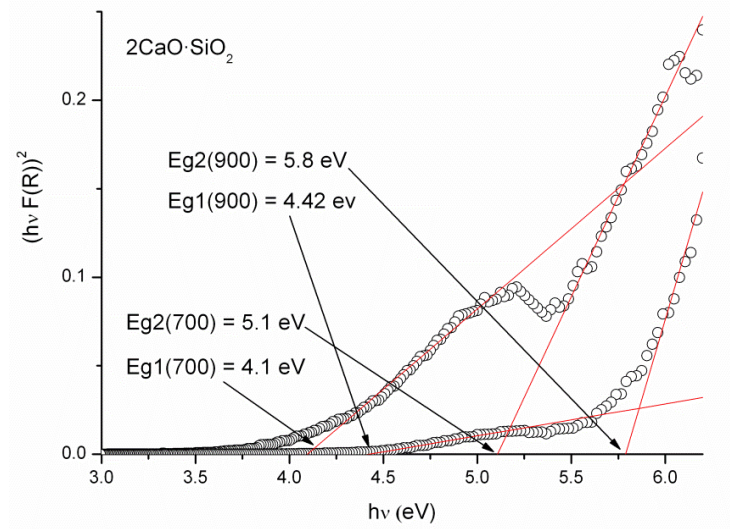


Fig. 7S. Kubelka-Munk transformed reflectance spectra (Tauc plot) of $2\text{CaO}\cdot\text{SiO}_2$ calcined at $700\text{ }^\circ\text{C}/2\text{ h}$ and $900\text{ }^\circ\text{C}/48\text{ h}$.

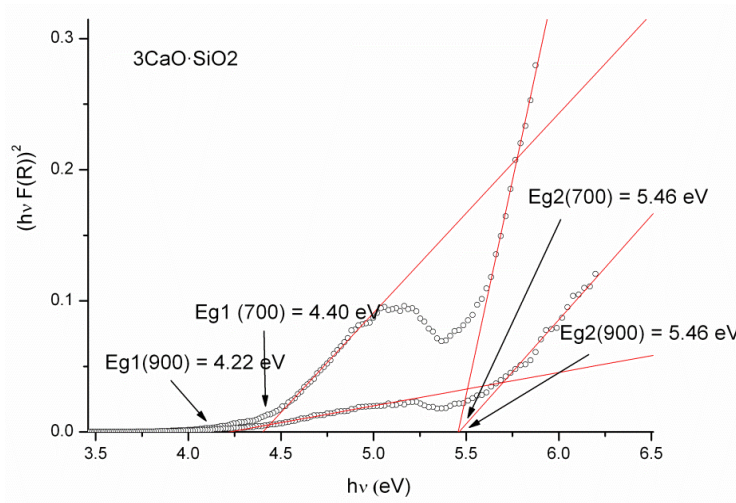


Fig. 8S. Kubelka-Munk transformed reflectance spectra (Tauc plot) of $3\text{CaO}\cdot\text{SiO}_2$ calcined at $700\text{ }^\circ\text{C}/2\text{ h}$ and $900\text{ }^\circ\text{C}/48\text{ h}$.

References

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- [S2] J. Tauc, A. Grigorovici, A. Vancu, Optical properties and electronic structure of amorphous germanium, Phys. Stat. Sol. 15 (1966) 627–637.