



CO₂ t s t i e - l t l it

Lǐ Tān, Jīng Hào, Dāng Dāng, Tāng Wēng, Jīng Lǐ, Lǐtān, Qī Wēng,

School of Materials and Metallurgy, University of Science and Technology Liaoning, Anshan 114051, Liaoning, China

School of Materials Science and Engineering, Georgia Institute of Technology, Atlanta, GA 30332, USA

Harvard SEAS-CUPB Joint Laboratory on Petroleum Science, Harvard University, Cambridge, MA 02138, USA

State Key Laboratory of Petroleum Resources and Prospecting, China University of Petroleum (Beijing), Beijing 102249, China

School of Physics and Optoelectronic Engineering, Ludong University, Yantai 264000, Shandong, China

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CO₂ t s time

C l it

C - 1 t

Density of timber yield

Aspirin

A B S T R A C T

It is stated, therefore, that the following factors test the CO₂ transport capacity of the system:

 1. The rate of CO₂ transport, which is a function of the CO₂ concentration gradient, the diffusion coefficient, and the cross-sectional area of the system.

 2. The rate of CO₂ production, which is a function of the CO₂ concentration, the rate of photosynthesis, and the rate of respiration.

 3. The rate of CO₂ consumption, which is a function of the CO₂ concentration, the rate of photosynthesis, and the rate of respiration.

 4. The rate of CO₂ storage, which is a function of the CO₂ concentration, the rate of photosynthesis, and the rate of respiration.

 5. The rate of CO₂ release, which is a function of the CO₂ concentration, the rate of photosynthesis, and the rate of respiration.

 6. The rate of CO₂ exchange, which is a function of the CO₂ concentration, the rate of photosynthesis, and the rate of respiration.

 7. The rate of CO₂ transport, which is a function of the CO₂ concentration, the diffusion coefficient, and the cross-sectional area of the system.

 8. The rate of CO₂ production, which is a function of the CO₂ concentration, the rate of photosynthesis, and the rate of respiration.

 9. The rate of CO₂ consumption, which is a function of the CO₂ concentration, the rate of photosynthesis, and the rate of respiration.

 10. The rate of CO₂ storage, which is a function of the CO₂ concentration, the rate of photosynthesis, and the rate of respiration.

 11. The rate of CO₂ release, which is a function of the CO₂ concentration, the rate of photosynthesis, and the rate of respiration.

 12. The rate of CO₂ exchange, which is a function of the CO₂ concentration, the rate of photosynthesis, and the rate of respiration.

1. Introduction

T s i e s i f e t l e l s s y l e l i
e t i f f e s e f l i t e t e t e s l . T s i s
s t j e y- e t e f t i e s s e f f e s s i f l s i s
CO₂ l e t e f CO₂ s i t t i t e t t e s l i
t e s i i f i t i s i l e l t t [1,2](#) . M i l , e
i f i

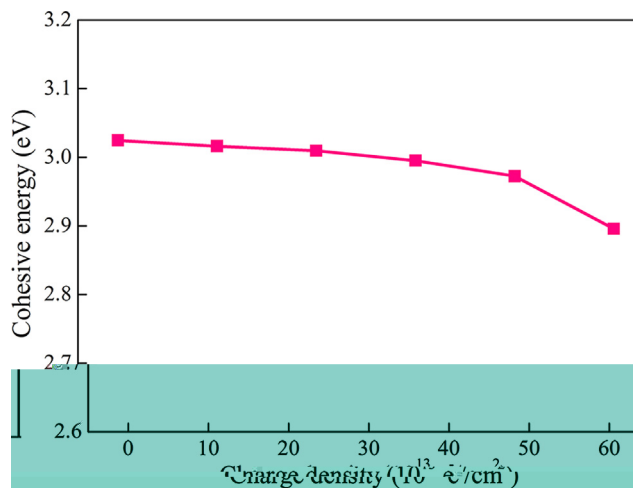


Fig. 2. Temperature dependence of the rate of polymerization.

3.2. Effect of charge density on adsorption behavior of CO₂ on calcite surface

It is still, first of all, the possibility of
self-sufficient CO₂ treatment systems
Not, however, the possibility of
sustainable CO₂ treatment
systems, which is the most important
of CO₂.

W t sity s titi l l , s el l ill
f y f t se t [19,20,22,39](#). Co s tly,
te e fi t titi l sity y l l ti t -
se tie ist ef sil CO₂ e lit s f s f tie ef
sity. B fe l l ti t titi l sity ef lit
s f , it is y ss y te fi t titi l se tie e fi
tie ef CO₂ e lit s f . CO₂ el l is t illy se t
l l i e sit e lit s f e t sis ef i e s st l s
[25,29,37,40](#), se t titi l se tie e fi tie ef CO₂ e lit
s f is is l y i [Fig. 1b](#). W t sity l s s f
0 to 18.56×10^{13} - / ², f e t t t se tie ist is
f e 2.69 A to 2.49 A ([Fig. 3](#)). It e st tCO₂ is es t t
l l s f s e f t t l t e s. H e CO₂ el l

$$s_{\text{ity}} = 18.56 \times 10^{13} \text{ }^{-2} \text{ (Fi. S1). T f } ,$$

$$18.56 \times 10^{13} \text{ }^{-2} \text{ (} s \text{ } i \text{ } 1.5 \text{ } i \text{ } j \text{ } t \text{ } t \text{ } i \text{ } s \text{ } f \text{)}$$

$$i \text{ } s \text{ } i \text{ } i \text{ } i \text{ } s \text{ } i \text{ } f \text{ } f \text{ } \text{CO}_2 \text{ } t \text{ } .$$

[illegible]

$$E_{\text{ads}} = E_{\text{total}} - (E_{\text{calcite}} + E_{\text{gas}}) \quad (3)$$

[illegible]

Gl ly, ɹ ti l s ts ɹ ɹ f l i t -
 ti t s ɹ l l t l i t s f . I , t
 sɹ ti y ɹ f t s ɹ t sɹ t t i l st

s f f ($\rho = 0$) i s s e e n i n F i g . 3 , t h e s e t i e y e f C O ₂ i s - 0.38 V . M a l l i e r e l t i e y l y s i s s e s t t e t s f f e C O ₂ e l l t e l i t s f . T h e s e t i e y e f C O ₂ i s y l y s i s e l l i t s f . I t s t i l y , t h e s e t i e y l y i s - t i l l y i s s e s t i e y l y s i s f e l l i t s f i s s , i s - 6.23 V t t i t i l y . T h e s e t i e y e f C O ₂ e t i s $18.56 \times 10^{13} \text{ }^{-2}$ s f i s e t 16 t i s e f t t e t l s f . M a l l i e r e l t i e y l y s i s s e s t t t e t s f f e t l i t s f t e t C O ₂ e l l i s 0.61 . A e l l y , t i s i l i t s t t t e f C O ₂ s e t i e e t l i t s f s f e y l y s i e t i e t e i s e t i e .

D t e t i e l e f C=O e i l t i f i l 4], t e
 s t y t f f t e f s i t y e s e t i e i e f C O 2 . W e
 t i e l e t e f C O 2 e l l C=O e l t s f t i e
 e f s i t y i F i . 3 . A s s e i F i . 3 , t i e l e t e f
 C O 2 e l l t l t e f t e l C=O e s i s -
 t i l l y s t s i t y e l i t s f i s s i l t
 s e t i e i s t s s . I t i t t y t i s i
 s t t i l t i f i l t t t l i t s f t e
 i s i j t l t s . F t e , t i s e f t s e -
 t i e y e f C O 2 e l l t t i t t e t i s e f t
 e l e t e f C O 2 e l l t s e f t s e t i e
 i s t . T f e , t e l i t i e e f C O 2 e l l i y

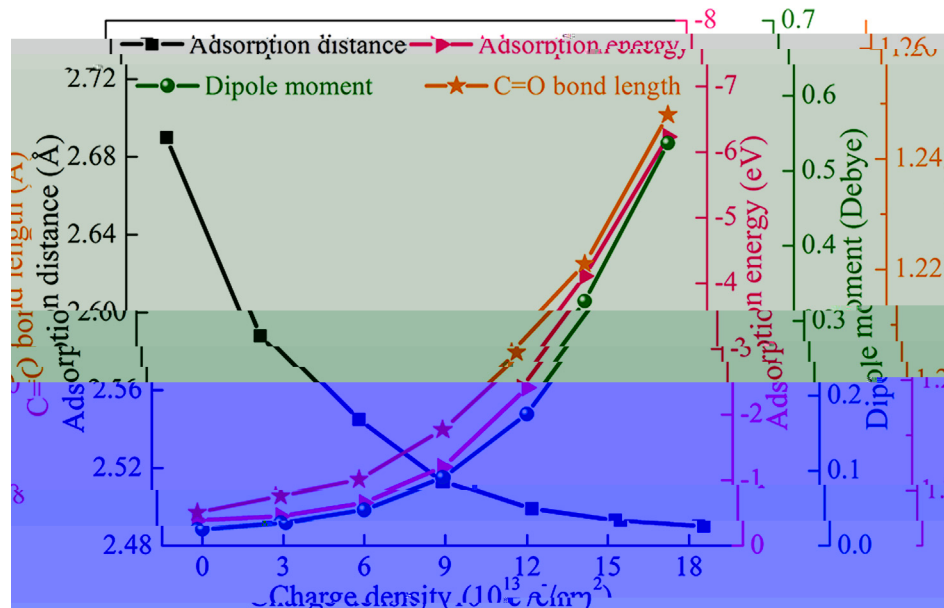


Fig. 3. A schematic diagram illustrating the reaction of CO_2 with C=O in the presence of a catalyst.

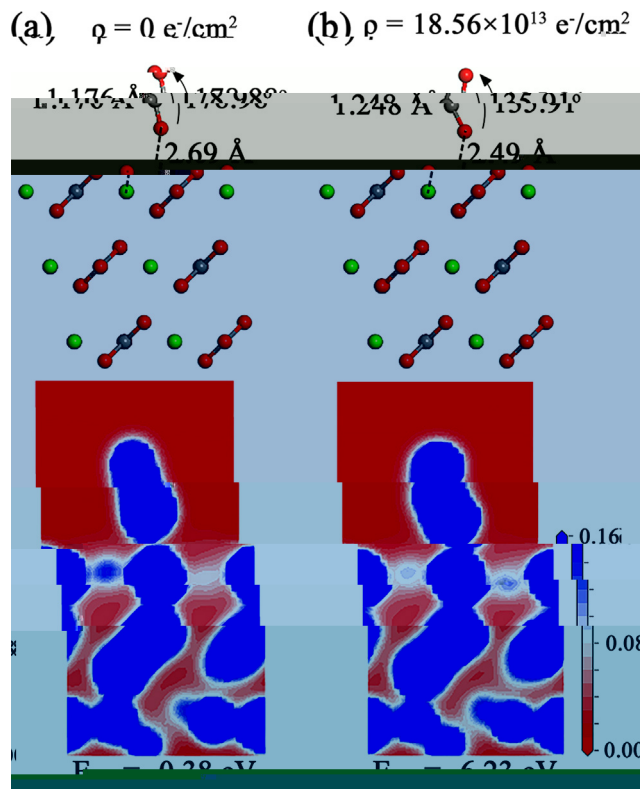


Fig. 4. A scatter plot showing the relationship between the concentration of CO₂ in the atmosphere (x-axis) and the concentration of CO₂ in the soil (y-axis). The data points are clustered around a positive linear trend line, indicating a strong positive correlation. The x-axis ranges from 0 to 0.16, and the y-axis ranges from 0 to 0.16.

ij ti l t s l ys si fi t l i t s e ti e y ef
CO₂ l l .

3.3. Adsorption mechanism of a single CO₂ on calcite surface at critical charge density

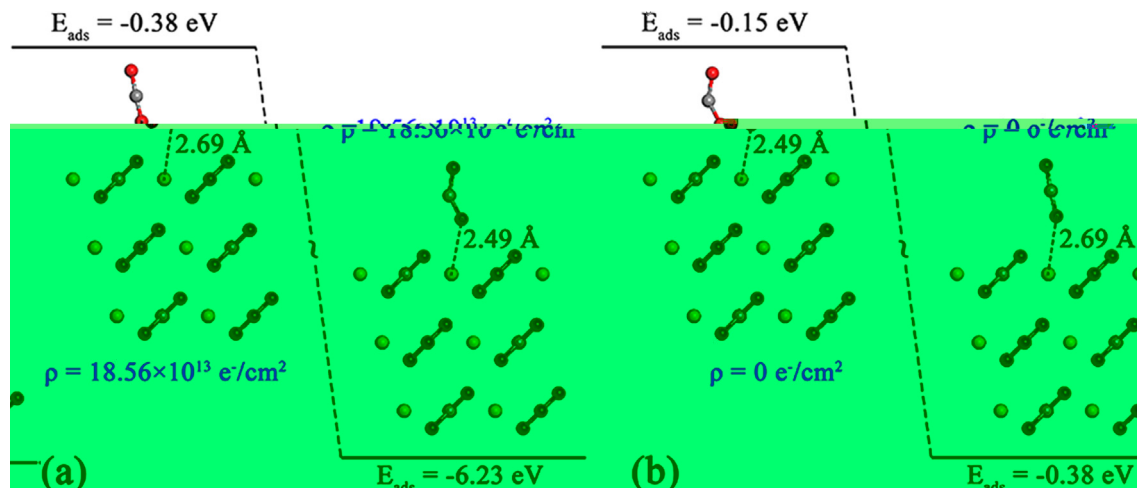
[illegible]

Fig. 5. K_i titration curves of CO₂-induced acidosis in the presence of 0.1 M NaHCO₃. The curves represent the mean ± SEM of four experiments performed in triplicate. (A) Dose-dependent inhibition of CO₂-induced acidosis by increasing concentrations of NaHCO₃. (B) Inhibition of CO₂-induced acidosis by increasing concentrations of NaHCO₃.

s e t s l y s e s e t l i t s f .

3.3.1. Detailed structure and electron density distribution of CO₂-calcite interface

The $\text{C}=\text{O}$ stretching frequency of CO_2 is 1330 cm^{-1} in the gas phase. In the solid state, the frequency is shifted to 1280 cm^{-1} due to the intermolecular interactions. The $\text{C}=\text{O}$ stretching frequency of CO_2 is 1330 cm^{-1} in the gas phase. In the solid state, the frequency is shifted to 1280 cm^{-1} due to the intermolecular interactions. The $\text{C}=\text{O}$ stretching frequency of CO_2 is 1330 cm^{-1} in the gas phase. In the solid state, the frequency is shifted to 1280 cm^{-1} due to the intermolecular interactions.

3.3.2. Reversibility of CO₂ adsorption and desorption

[illegible]

t est st l e fi tie ef CO₂ ysis e t l lit
s f .O ie sly, t sity ef 18.56× 10¹³ - / ²
s e f e l it s f ,CO₂ el l s e t e sly
se f e l it s f t sf tet ly ysis -
tie e fi tie .F t e ,t se tie ss is ls e -
t i y 0.23 V it et y y i .H ,t CO₂
se tie / se tie ss e l it s f si l
sily e l t i j ti / t ti t l tes.

3.3.3. Spontaneity of CO₂ adsorbed on calcite surface with critical charge density

E | t i t y i t i s s f i l l e t i
t CO₂ s e t l i t s f t l f t t -
t s. F e t l l i e f t y i t i s, t
l l t t t y t l y t t G i s f y. H ,
t y s f i s t l l t y

$$S = S_{\text{trans}} + S_{\text{rot}} + S_{\text{vib}} \quad (4)$$

$$t_{\text{eff}} = t_{\text{eff},y} + \frac{S_{\text{trans}}, S_{\text{rot}}, S_{\text{vib}}}{k_B T_{\text{eff}}} - \frac{t_{\text{eff},y}}{T_{\text{eff}}} \left(\frac{\partial \ln Z}{\partial \ln K} \right)_{T_{\text{eff}}}$$

$$H = H_{\text{trans}} + H_{\text{rot}} + H_{\text{vib}} + RT \quad (5)$$

H , H_{trans} , H_{rot} , H_{vib} t t l y , t s l t i e t l y ,
 $\text{et } t$ i e t l y , i t i e t l y (l $/$ e), s t i l y ; R
 T t i l s e s t (8.314 J/ e/K) t s l t
 t t (K) , s t i l y ; F i l y , t G i s f y s $-$
 f s

$$G = E(OK) + H - T \cdot S \quad (6)$$

G $E(OK)$ t G s f y ($/$ ϵ) t e
 ϵ t y ($/$ ϵ), s t i l
 T t i t e y i j t i s s e i
 S j t y M t i J C s t i y i
 f t i s e f t e y (ΔS , $/$ ϵ $/K$), t j y (ΔH , $/$ ϵ),
 G s f y (ΔG , $/$ ϵ) i t t (K) j
 j t s t e y t f f t e t e CO_2 s t i e t
 j t s f i s i t y e f $18.56 \times 10^{13} / ^2$ (Fi. 6). As
 s e i $Fi. 6$, s e t j s e f ΔS ΔH , t j s e f ΔG
 i $. T$ ΔG i s s j j i t i s i t t $,$
 e i t ΔG j i s t i j e i t j $900 K$. It
 i t s t t i s e t e f CO_2 e t j i t s f i t
 i j s i t y e f $18.56 \times 10^{13} / ^2$ e s e t $-$
 e s j t t t t j $900 K$.

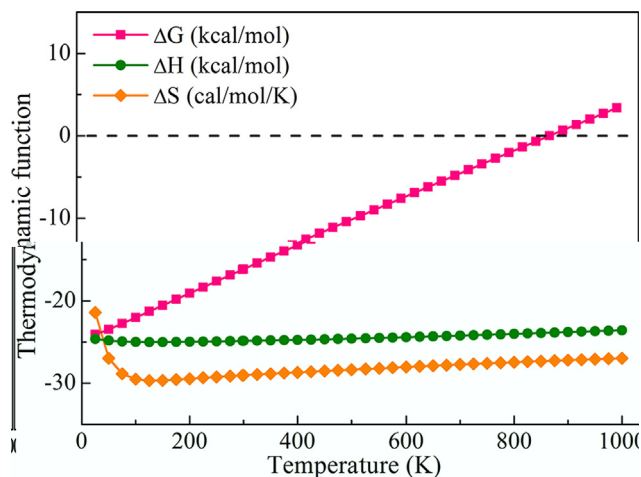


Fig. 6. Temperature dependence of CO_2 sorption in polyethylene at 100 atm.

3.4. Applications of CO₂ capture and separation

3.4.1. CO₂ capture capacity of calcite surface at minimum charge density

[illegible]

B sil s, t e fi f t is s e l y ef CO₂ s e
 l it s f , t e s t y it t it l sity t e s
 i s e t i e y. F e t is s e , i t t -
 s e t i e i e f t f i t CO₂ e l l e l it s f i t t
 it l sity ef 18.56 × 10¹³ /² (Fi. 8a). As t Fi. 8b
 s s t s, t f i s t l y is f i l l , t f i t CO₂ e l l l l e
 l e s e e l l it s f . It e l s t t CO₂
 e l l e l y f e e l y e l l it s f , t
 t it l sity.

[illegible]

3.4.2. Separation performance of CO₂ from calcite surface in gas mixture

[illegible]

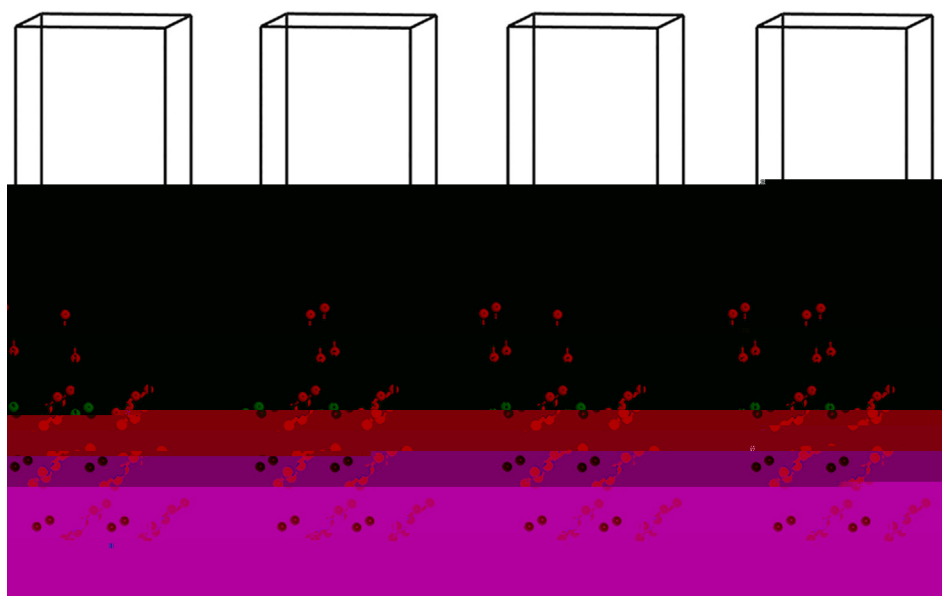


Fig. 7. Total sulfate efficiency of CO_2 release from soil.

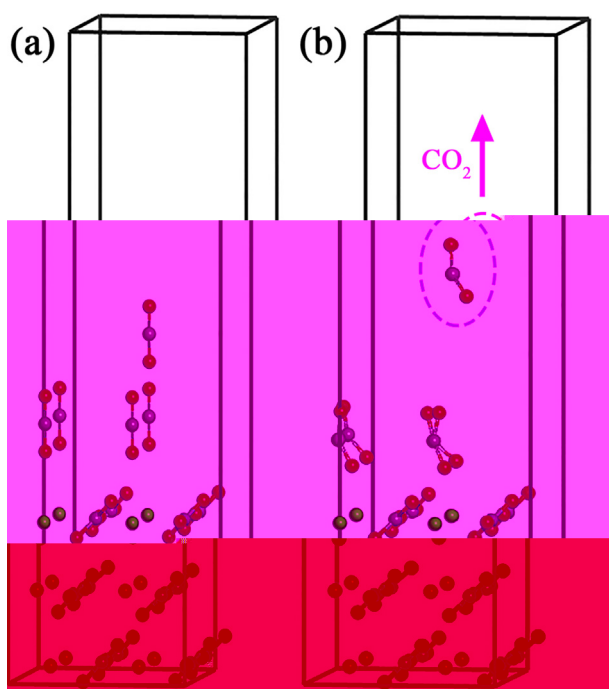


Fig. 8. A set of tie efficiency CO_2 plots for the set of tie efficiency plots. () Tie efficiency CO_2 plots for the set of tie efficiency plots. () Tie efficiency CO_2 plots for the set of tie efficiency plots.

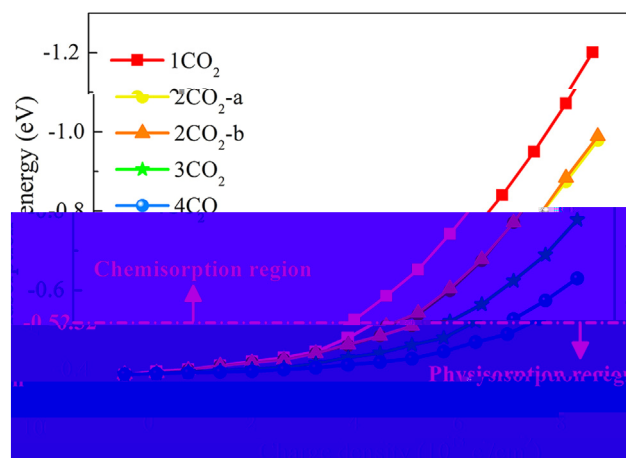
[illegible]

Fig. 9. T t s e t i s e f $C O_2$ t i f t
 s i s $“ ”$ $“ ”$ s t t e i f t s e t e f i t s
 (Fig. 7a and 7b), s t i l y .

Table 1

Carbon isotope of CO ₂ -sequestered	Concentration (10 ¹³ t ⁻²)	Concentration (10 ¹⁴ t ⁻²)
Geological [18]	61.70	7.39
Biogenic [19]	52.50	6.73
Natural [22]	40.90	2.45
C ₃ N [20]	22.00	2.13
Calcite (this study)	8.04	4.95

saturation, it is still the state of equilibrium (Fig. S3). However, at N_2 , H_2 , CH_4 , CO_2 is still a saturated state. It is likely that the state of equilibrium for CO_2 is still a saturated state for N_2 , H_2 , CH_4 .

4. Conclusions

Thus, DFT is suitable for the study of

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(G t N e. 51634004, 51874169 51974157) i s t f l l y -
e l .

