

Fig. 1. Relationship between gray-scale value and RGB values.

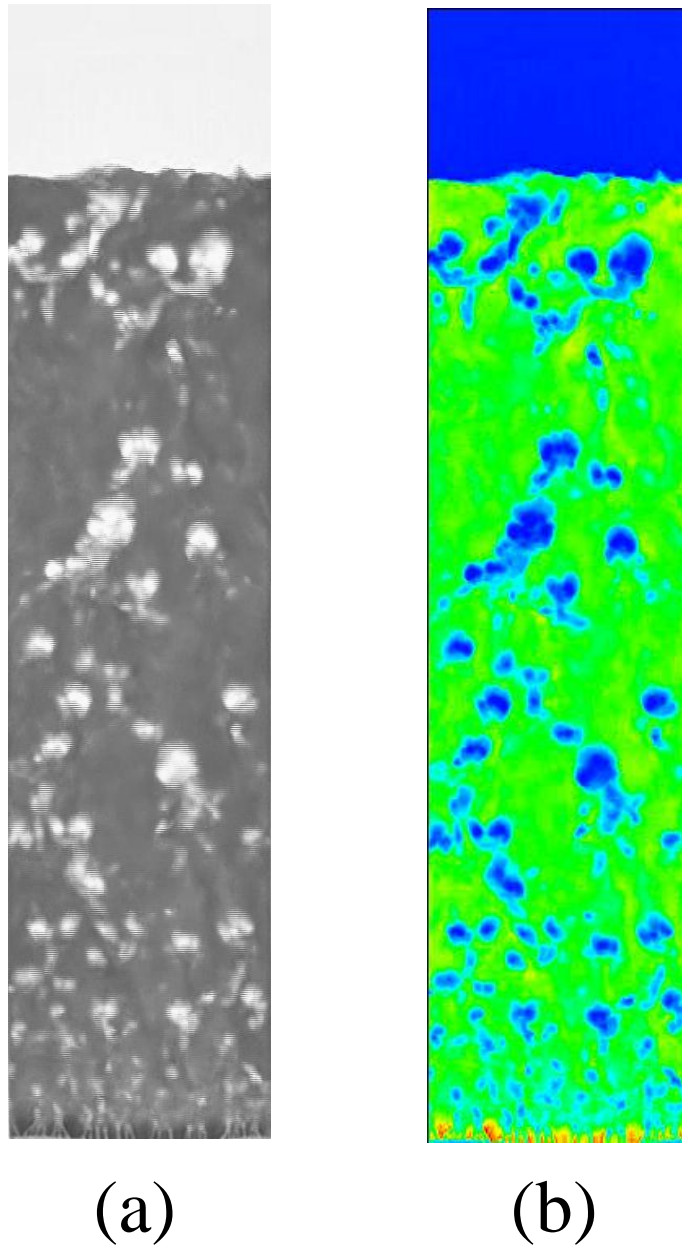
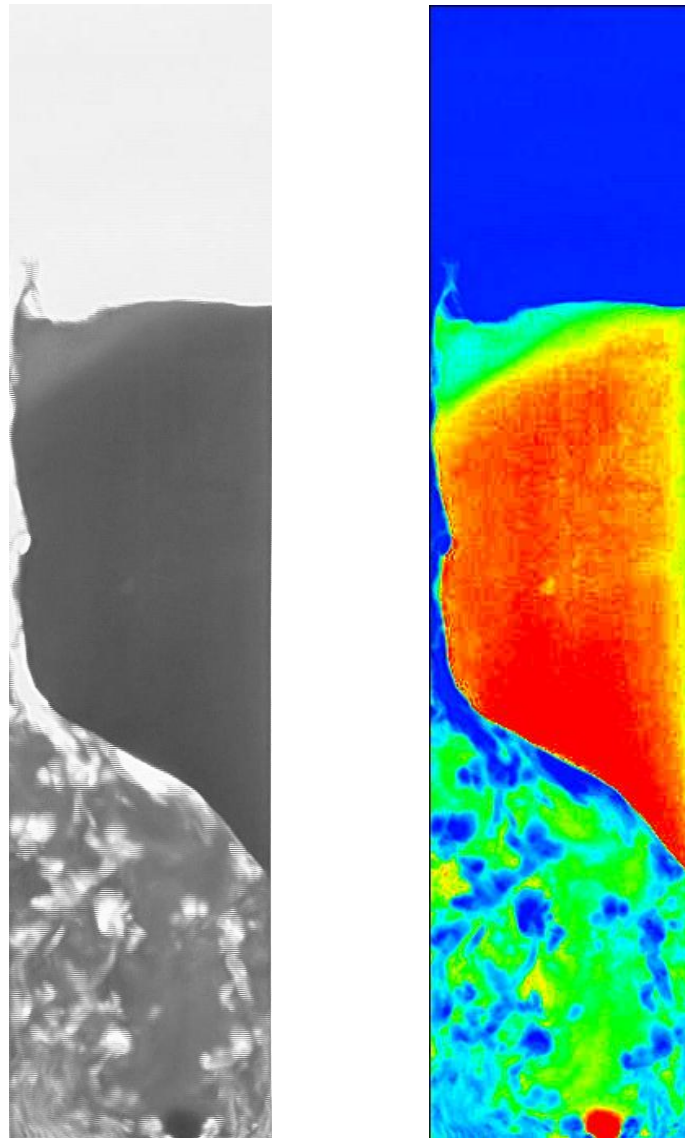


Fig. 2. Good fluidization quality after switching from Ar to He: (a) gray-scale picture, (b) colored picture.



(a)

(b)

Fig. 3. Defluidization phenomenon after gas switching from He to Ar: (a) gray-scale picture, (b) colored picture.

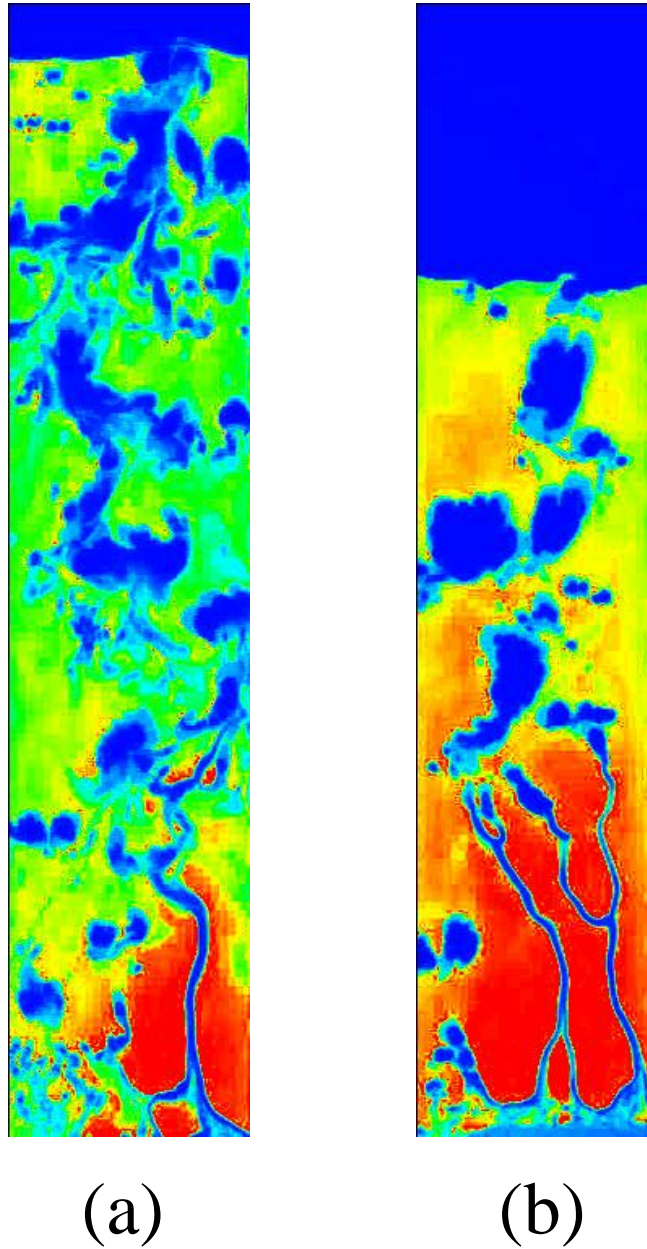


Fig. 4. Effects of the first gas on the emulsion phase voidage after 2 s of gas switching (a) from He to Ar and (b) from H₂ to Ar.

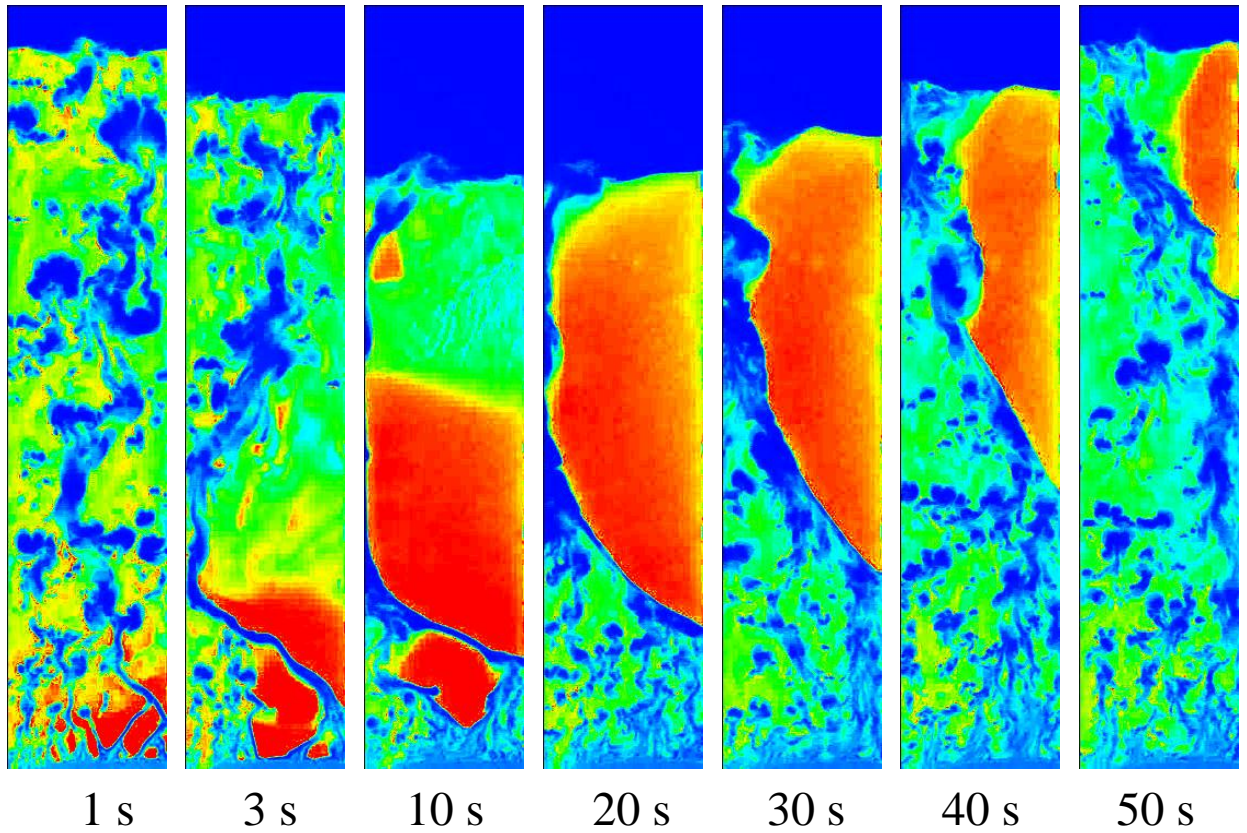


Fig. 5. Transient defluidization after gas switching from He to Ar. See also supplementary video 1.

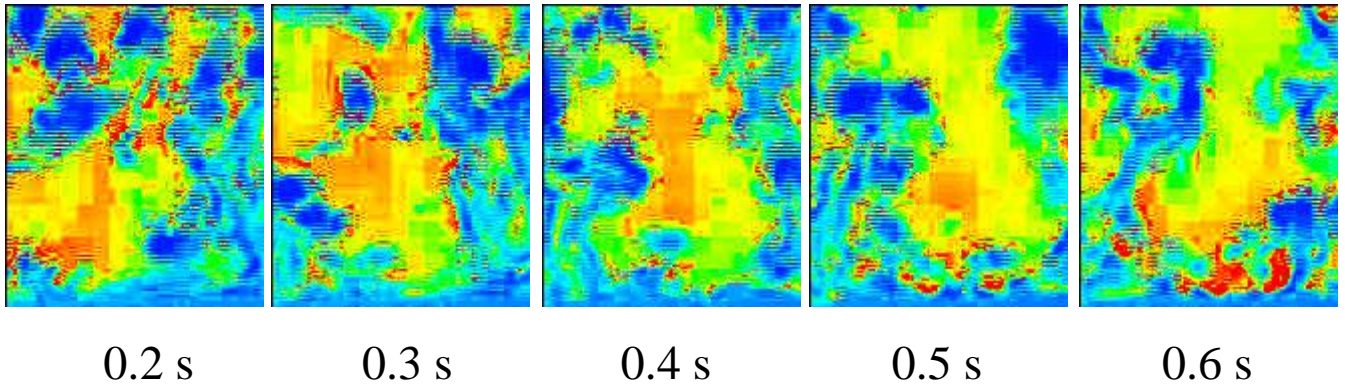


Fig. 6. Change in the emulsion phase voidage at the bottom of the bed after gas switching from He to Ar.

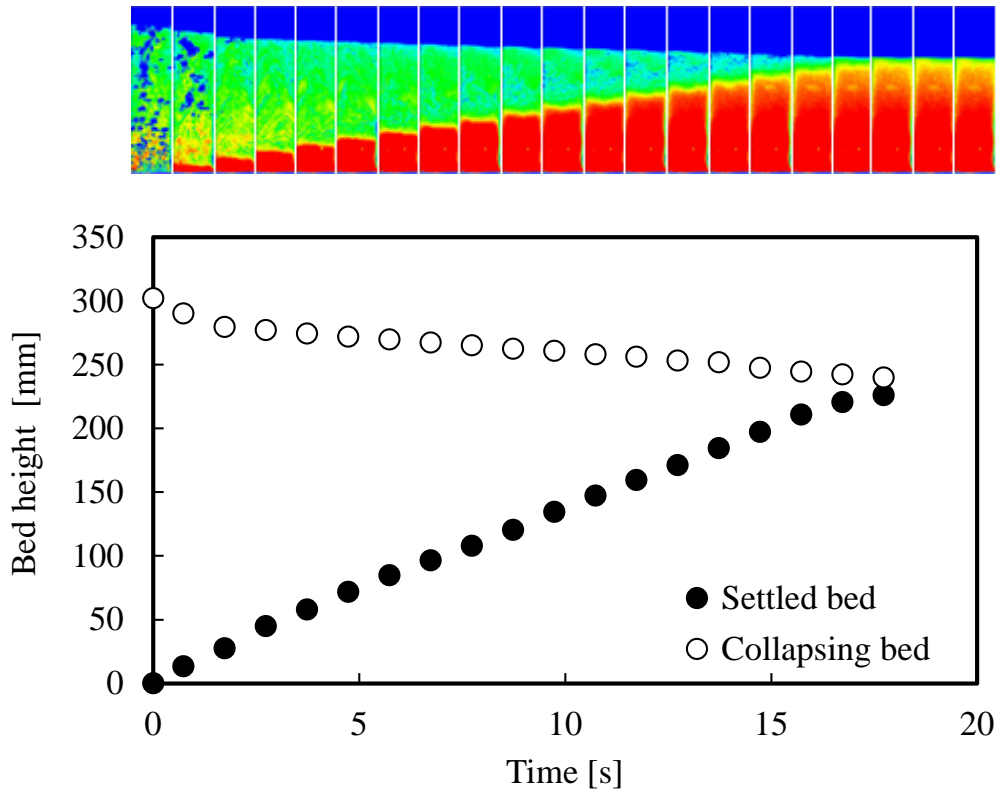


Fig. 7. Two regions during the bed collapsing process.

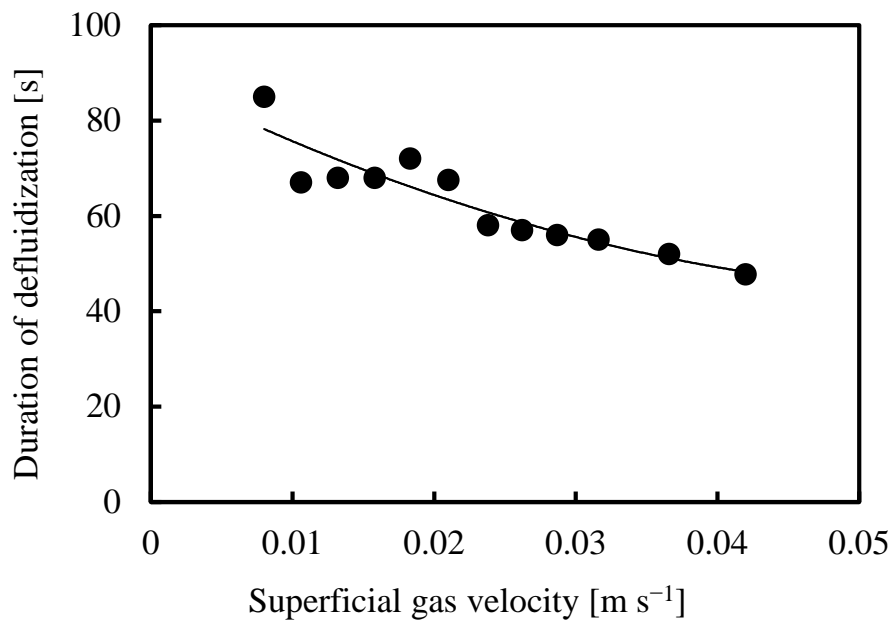


Fig. 8. Effect of superficial gas velocity after gas switching on the duration of defluidization.

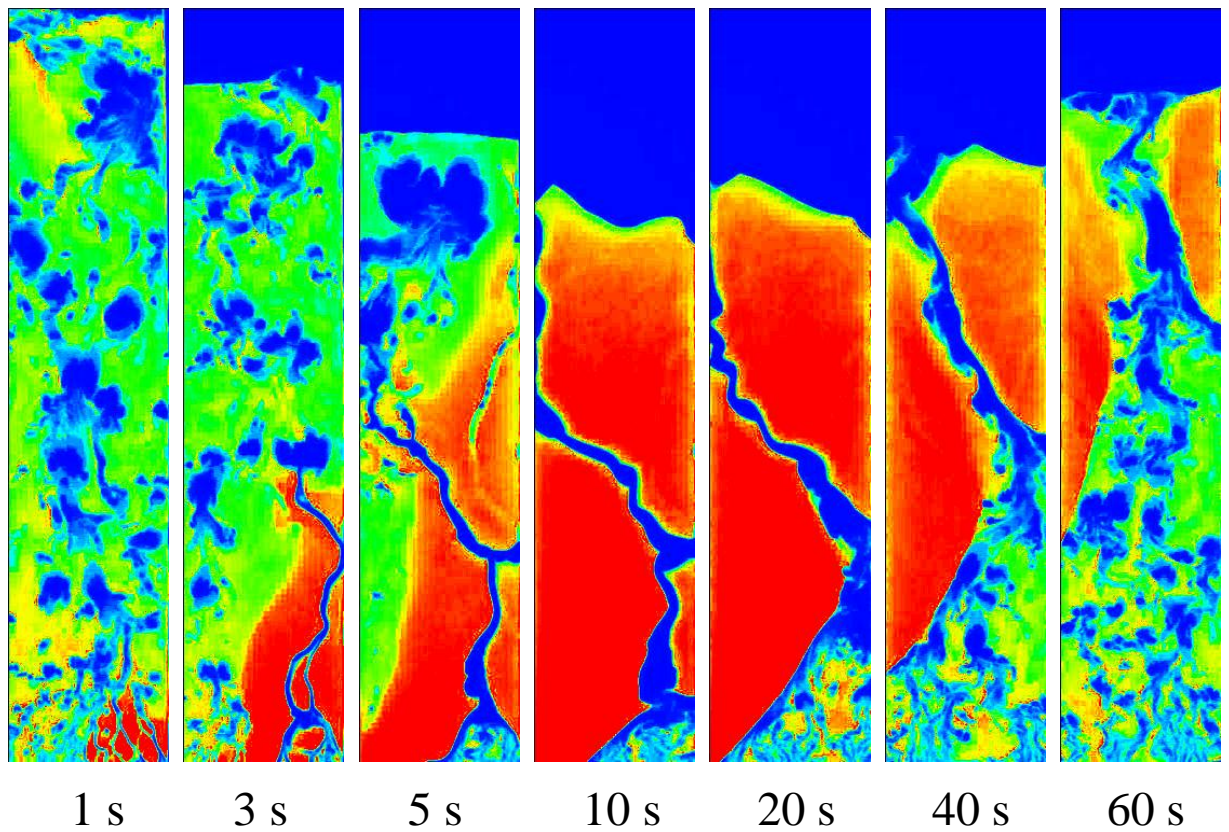


Fig. 9. Severe defluidization after gas switching from He to CO₂. See also supplementary video 2.

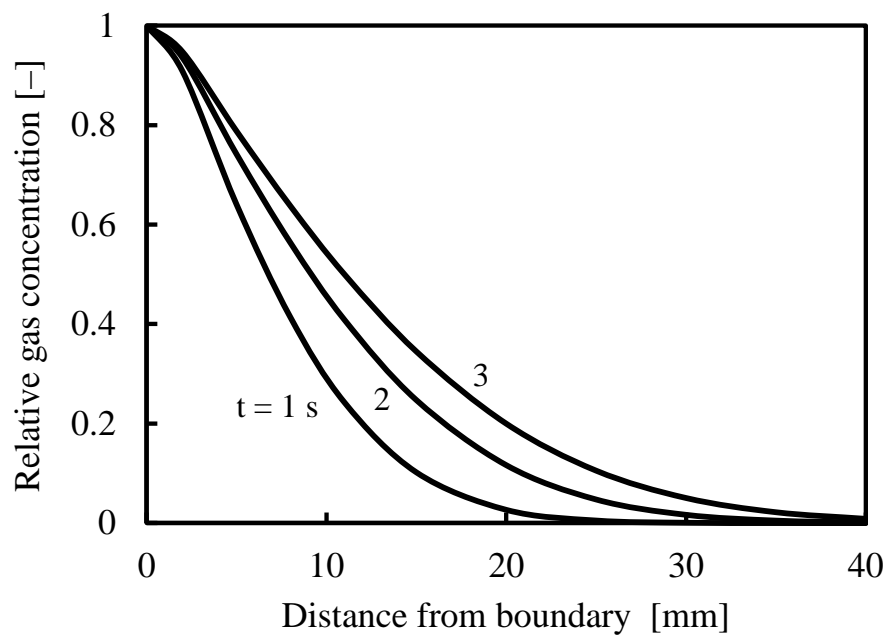


Fig. 10. Calculation of CO₂ diffusion in a packed bed.

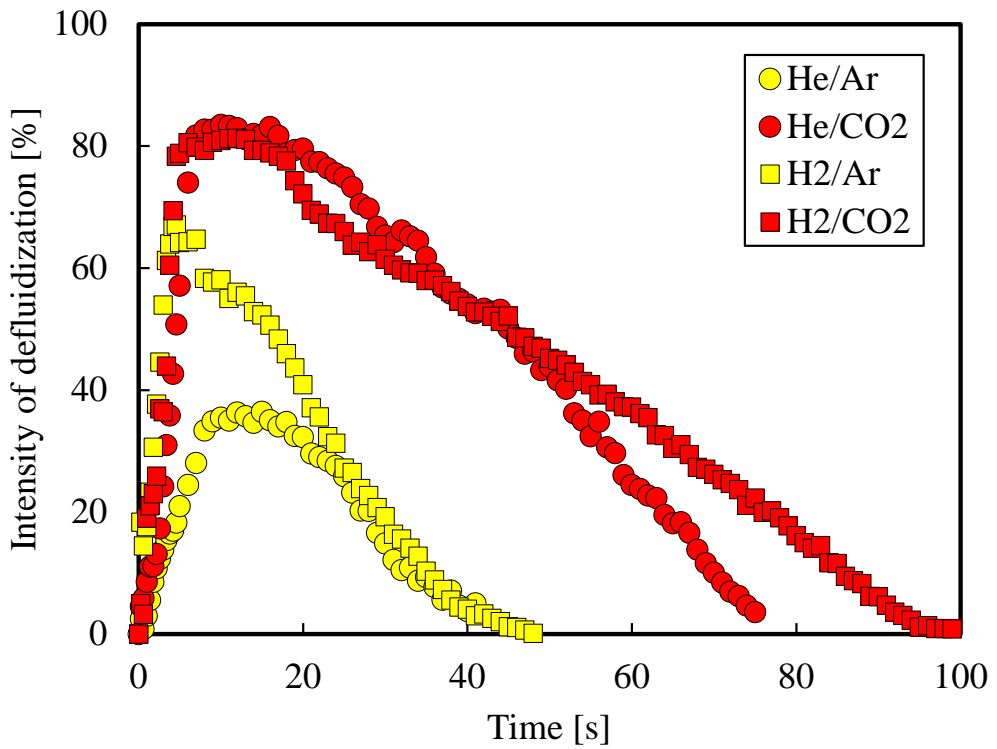


Fig. 11. Change in the extent of defluidization area after gas switching.

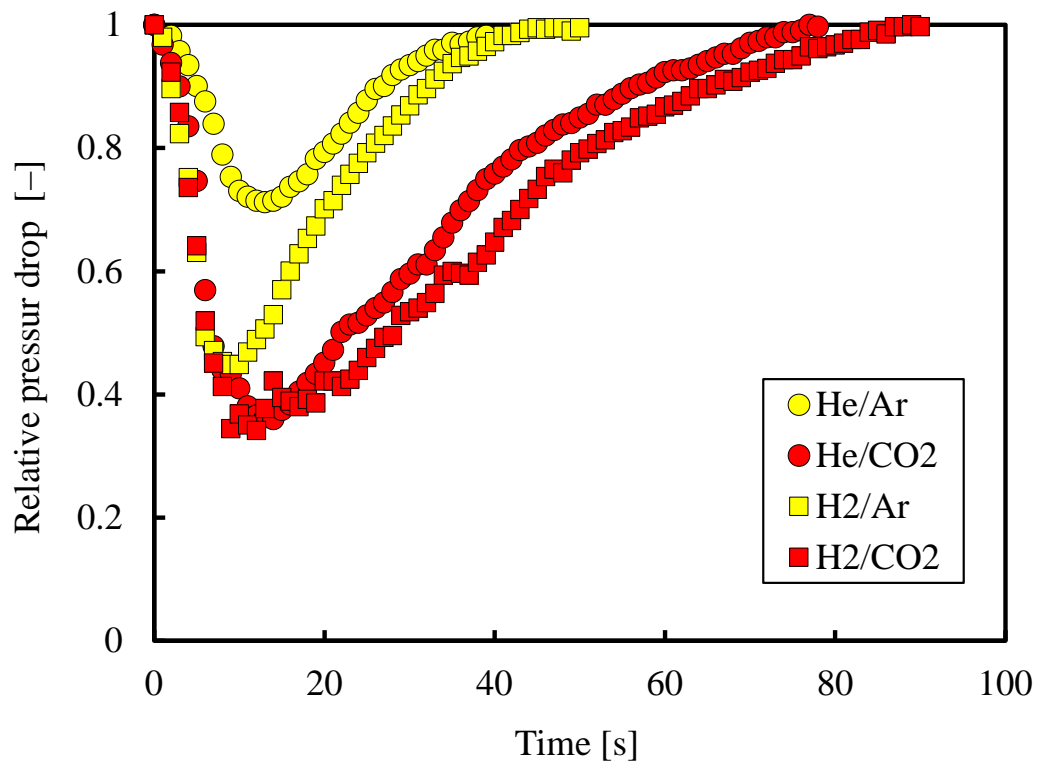


Fig. 12. Change in pressure drop through the bed after gas switching.