

Relationship Between the Mass Transfer Rate and the Operating Condition in  
Reciprocally Shaking Vessels

이영세<sup>†</sup>, 지민봉<sup>1</sup>, 오경미<sup>1</sup>, 전지수<sup>1</sup>  
경북대학교; <sup>1</sup>경북대학교 나노소재공학부  
(ysl@knu.ac.kr<sup>†</sup>)

The purpose of this study is to find the relationship between the mass transfer rate and the operating condition in reciprocally shaking vessels. The volumetric mass transfer coefficient from the liquid free surface was measured and correlated by using the power consumption. The power consumption of the reciprocally shaking vessel in the range of the rotational flow can be correlated by the equation that had been reported for the rotational shaking vessel. The oxygen mass transfer rate in the reciprocal shaking was correlated with the power consumption per unit volume and was larger than that of the rotational shaking. The  $k_L a$  of the reciprocal shaking was larger than that of the rotational shaking and can be correlated by the following equation.

$$N_p = 934 Fr^{3/2} Re^{-1/4} (d/D)^{3/2} \quad (N_{tr2} tr3)$$

$$k_L a = 1.43 \times 10^{-4} P_v^{0.54} D^{0.79} H^{-1.3} \quad (N_{tr2} tr3)$$