

Reply to Comments by P. L. Silveston and R. R. Hudgins

In reply to the comments (1) on our note (2) concerning the cyclic operation of a benzene hydrogenation reactor, we agree that an increase in instantaneous conversion does not necessarily mean an increase in the time-averaged conversion. In our article we made no claim to the contrary. We made a series of corresponding observations on two independent responses of the same system. Our results established a link between the two. There was no scope for any systematic error in our experiments as long as it was ensured that the pairs of observations corresponded to each other. Care was taken to achieve this.

As indicated in our note, the object of the study was to measure the temperature of a single catalyst particle and the instantaneous conversion under periodic feeding in the hydrogenation of benzene and to examine whether they had a common pattern. Although observations were made continually, for convenience only selected values were presented in Fig. 3 of our article. Our observations showed that there is a nexus between the particle temperature and the

instantaneous conversion. To explain this, we invoked the heat balance in the catalyst particle for which the particle thermal conductivity is more critical than the fluid thermal conductivity. In supporting our claim, we not only explicitly agreed with the observations of Prairie and Bailey (3), but went on to supplement their argument by stating that a temperature-induced change in adsorbate concentration (to borrow a phrase from the comments (1)) or a shift in chemisorption equilibrium could explain this behaviour more satisfactorily.

REFERENCES

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K. B. S. PRASAD

*Indian Institute of Chemical Technology
Hyderabad 500 007, India*

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