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Reply to F. Solymosi

I am writing this in response to Professor F. Solymosi's accompanying letter (*1*). Professor Solymosi asserts that our initial studies of metal/titania systems represented a "breakthrough in the use and extension of (his) idea, i.e., the role of an electronic interaction between metal and support . . ." The clear implication is that we were stimulated to undertake these investigations by Professor Solymosi's published work. It is then implied that we failed to acknowledge this influence.

I wish to state, therefore, that Professor Solymosi's belief in this matter is incorrect. It is the work of the late Roland Ward and colleagues at the University of Connecticut that prompted our research. Their description of metal–metal bonding between titanium cations and cations of various Group VIII metals (*2*) led us to conjecture that titanium cations at oxide surfaces might be reactive toward supported metals. Without Ward's studies, our research into metal/titania systems would not have occurred. These facts have been pointed out before (*3, 4*).

We were, of course, aware of Professor Solymosi's writings on the subject of metal–support interaction as well as those of the late Professor Schwab. It was our view, however, that the Schwab/Solymosi concept, focusing on the electrical properties of the carrier, was unduly restrictive and had the effect of underestimating the potential scope and intensity of metal–support interactions. Schwab himself pointed out that "the number of free electrons in a metal is several orders of magnitude higher than in semiconductors" (*5*) and proceeded, for this reason, to devote the last phase of his research to "inverse" systems, i.e., oxides supported on metals.

My own view of metal–support interactions has always been more "chemically" oriented, inspired, as noted above, by the solid-state chemistry literature. Such a view focuses on interactions with surface cations, which makes bulk conductivity irrelevant.

This is not the place to discuss the relative merits of these (or other) approaches. Certainly, the recent spate of research in this area has taught us that the problem is far more complex than anyone imagined a few years ago. I wish only to point out, in response to Professor Solymosi, that our research was in no sense a utilization of his idea; rather it stemmed from a very different source.

REFERENCES

1. Solymosi, F., *J. Catal.* **94,** 581 (1985).
2. Ward, R., *et al., J. Amer. Chem. Soc.* **83,** 3026 (1961).
3. Tauster, S. J., Fung, S. C., and Garten, R. L., *J. Amer. Chem. Soc.* **100,** 170 (1978).
4. Tauster, S. J., Fung, S. C., Baker, R. T. K., and Horsley, J. A., *Science* **211,** 1121 (1981).
5. Schwab, G. M., "Advances in Catalysis," Vol. 27, p. 1. Academic Press, New York, 1978.

S. J. TAUSTER

Clinton Township
Route 22 East
Annandale, New Jersey 08801

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