Erratum—From the Editor

The following Editorial was inadvertently left out of the previous issue of this *Journal* (Vol. 47 no. 5). Readers should consult the papers by Drs. Hibino (p. 379) and Tani (p. 463) in connection with the Editor's comments, below.

In this issue of the *Journal* we feature papers from IS&T's 18th NIP Conference, held in 2002 in San Diego, CA. The Feature Article is not only from that Conference, but is also based on the Kosar Memorial Award lecture presented there by Dr. Ikuo Hibino. The Kosar Memorial Award is an important recognition for the significant technological contribution of an individual or team in an area of imaging outside the traditional areas of silver halide photography, imaging optics, electrophotography, and electronic imaging. The opportunity for the Award recipient to publish a Feature Article in the *Journal* is one aspect of the recognition he is receiving from IS&T.

I would like to call our readers' attention to another important paper in this issue, which I believe will come to be recognized as one of the landmark papers of silver halide science. It is "Silver Clusters of Photographic Interest—Part VII" by Drs. Tasaka, Murofushi and Tani, which appears as the last paper in this issue. Heretofore, to silver halide scientists the latent image was much like God: no one has seen either one or the other.[1,2] This situation is now changed; using elegant, state-of-the-art electron microscopic technique, Dr. Tani and his co-workers show us the latent image. This achievement is the culmination of a century of endeavor by silver halide scientists.

The fact that the latent image cluster may be much larger than previously expected represents not only a challenge to the theories of how it is formed, but, more significantly, requires re-thinking of the classical stochastic model of the characteristic curve of silver halide materials.[2] (See Fig. 5 of Tani's current paper). This re-thinking must extend also to the modeling of the response of photothermographic materials, to which the stochastic treatment has historically[3] been extended, although experimental evidence seems to be at variance with some of the assumptions on which the stochastic model is based.[4] Development of a more realistic, phenomenologically based model for the characteristic curve, as demanded by this new result, should be a fine challenge for the photographic theoreticians in our community.

Another feature of the results presented by Tani and co-workers, again with their characteristic understatement, is the appearance of a maximum, as well as a minimum, size for the functional latent image cluster. Even at saturation exposures, they do not see clusters larger than ca. 1500 silver atoms; further exposure apparently leads to formation of redundant latent image centers as originally suggested by Spencer.[5] This result represents a point of correspondence between latent image theory and the theory of photographic development, which is usually expressed in terms of two models: a thermodynamic one,[6,7] and a kinetic one derived from the formalisms of electrochemistry.[8-10] The direct, chemical development process, which operates in its purest form with surface developers of the type used by Tani and co-workers, can also be broken down into two stages, initiation and continuation. These are experimentally distinguishable both in terms of kinetics[11] and morphology of the silver deposit—spheroidal in the first case and filamentary in the second.[8,12] It has been proposed that the thermodynamic model applies to initiation, while the electrochemical model applies to continuation.[11] Using mathematical expressions appropriate to these two models we have shown that the transition from one mechanism to the subsequent one in direct development should take place when the growing silver deposit reaches a size of about 2000 atoms, in agreement with observations by electron microscopy.[8,12] This estimate is, I believe, not coincidentally of the same order of magnitude as the limiting size, reported in the paper presented in this issue, for photolytically produced silver clusters, insofar as the thermodynamics governing both processes, i.e., the free energy of formation of the silver(0) deposit, is the same.

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