Guest Editorial

We are pleased to present this third issue of Drying Technology which focuses on innovation and nonconventional drying techniques. Like its predecessor issues which appeared in 2007 and 2008, this issue covers a broad range of topics. R&D in drying is about improving productivity via reduced energy consumption, improved environmental performance and improved bottomline of the dehydration process. The objective is to produce better quality dried product with lower capital cost and lower operating costs. Many new ideas have been developed to various stages but they are in need of further R&D and further testing before they can be considered for widespread application. Here we have included several such concepts in the hope that they will trigger further R&D and additional enhancements.

The first issue devoted to innovative drying techniques covered spray drying, supercritical drying, atmospheric freeze drying, catalytic solar drying, multi-stage heat pump drying, adsorbent drying etc. Here, for the benefit of readers who may have missed the previous issue, we give a brief summary of topics it covered.

Use of microwave (1) and ultrasonic fields to enhance drying kinetics is not new but it still belongs to nonconventional drying technologies as much remains to be achieved before these processes will be widely applied. Cost-effectiveness remains an issue for these techniques. Ultrasonics may be applied as pre-treatment to wet materials before they are introduced into the dryer (of any type but here Reference 2 deals with freeze drying- an expensive drying process for which any means of intensification will be a plus). Reference 3 deals with a potentially attractive application of superheated steam drying technique to dry oil palm empty fruit bunches. The many advantages of superheated steam drying are well known but currently the effect on quality of specific products needs to be examined experimentally.

Reference 4 deals with an innovative approach to design a modified hydrocyclone for nonthermal dewatering that minimizes erosion rates relative to current cone-on-cylinder designs. The approach taken by authors is purely via mathematical modeling of the complex two phase system. A parabolic design of the bottom cone is shown to reduce the maximum erosion rate by an order-of-magnitude. This design needs to be tested experimentally. If successful this can be a boon to the mineral processing and even some waste management industries that employ hydrocyclones for solid-liquid separation extensively. As most minerals are abrasive life of the conventional hydrocyclone is limited.

Use of a modified fluid bed drying technique viz. pulsed fluid bed dryer, is the theme of Reference 5. Such a dryer behaves like a vibrated bed dryer. Reference 6 deals with application of ultrasonic field in osmotic drying of papaya. Cavitation by ultrasonically-induced pressure pulsations can rupture cell walls and thus enhance osmosis. Again, the concept is known for some time but as a nonconventional technique much R&D is needed before the idea can be commercialized.

Reference 7 discusses application of adsorption drying to rice husk while reference 8 is concerned with application of successive variations in pressure to enhance drying rate and also modify product properties. Both themes have been examined in earlier issues but they both remain in the category of nonconventional drying techniques.

References 9-11 are cited here for the benefit of the novice researcher to the exciting and challenging field of thermal drying. Indeed, the ideas presented in these articles have stimulated drying research in many parts of the world since they provide capsule and authoritative summaries of the current state-of-the art of drying R&D and provide a mine of new ideas to research without having to search a massive volume of literature that is continuously exploding around the globe. Reference 11 is interesting in that it encourages innovation via mathematical modeling. Such an approach is of course highly cost-effectively and devoid of any risk. Experimentation is both expensive and risky if it is done "by groping in the dark".

Finally, we hope that this issue will again be a minefield of new ideas for academia and industry alike. We do not wish to infer that other issues of the journal do not contain valuable articles dealing with innovation. Indeed, they do and we encourage readers to stay informed by regular access to this journal.

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