

## Zero valuable content tailing

Farshid Zamani, H. Hussin and Syed Fuad S. Hashim

School of Materials and Mineral Resources Engineering, Malaysia

One of the main concepts in mineral processing circuit design is producing required product with highest weight recovery. Because of required product quality limitations, it puts low-grade products and fine materials inside a gray region. Most of the time, this design concept cause to reject fine particle and low-grade flow of materials from dressing circuits and ends with considerable amount of valuable mineral losing into tailing dam and pounds. Markets and new needs for raw materials in conjunction with technical developments in fine and ultra-fine particle processing techniques promising the need to change that general agreement concept to better one like producing tailing with zero valuable mineral content.

In this article, an industrial iron ore processing plant alternative with 3.2 Mtpy tailing production has been studied and a pre-feasibility technical study of producing various products and achieving to zero valuable content tailing has been studied and the results showed that it is possible to have a tailing with less than 10% total iron content just by magnetic separation.

### Biography

Farshid Zamani is a Ph.D. candidate at School of Materials and Mineral Resources Engineering of USM University and has up to 13 years work experience in the field of mining and mineral processing.

f\_zamani\_ir@yahoo.com

## Spray deposition and characterization of TiO<sub>2</sub> blocking layer in dye-sensitized solar cells

Guan-Jun Yang, Hai-Long Yao and Jun-Hua Ma

Xi'an Jiaotong University, China

The recombination between electrons and I<sup>3-</sup> at the interface between the conductive substrate surface and electrolyte is an important factor resulting in dark current in dye-sensitized solar cells (DSC). The blocking layer on substrate surface could prevent the charge recombination and thereby enhance the photovoltaic performance. To aim at developing highly efficient flexible solar cells, spray deposition method was proposed to prepare blocking layer at low temperature. The TiO<sub>2</sub> nano-powder (JR05) with a size range of 5-10 nm was used for spray deposition of blocking layer. In order to avoid cracks and decrease the deposition temperature, a mixed dispersant of ethanol and water was chosen in this study. The microstructure and electrochemical property of the blocking layer was examined to correlate them with the photovoltaic performance.

Results show that the film presented a relatively flat surface morphology. The film thickness could be controlled from 80 to 900 nm. The transmittance of the film decreased with the increase of blocking layer thickness. The electrochemical results indicated that the electron recombination at the substrate/electrolyte interface can be effectively suppressed by the blocking layer. Photovoltaic results show that the short circuit current density and thereby the photo-to-electric energy conversion efficiency of the solar cells was increased with a blocking layer of a suitable thickness. However, the photovoltaic performance decreased when the blocking layer became thicker than 300 nm due to the significant electron transport resistance of the blocking layer.

### Biography

Guan-Jun Yang has completed his Ph.D. from Xi'an Jiaotong University in 2005 and has been a full Professor at the same University. He has published more than 50 peer reviewed journal papers and has made ten invited talks at international conferences.

ygj@mail.xjtu.edu.cn