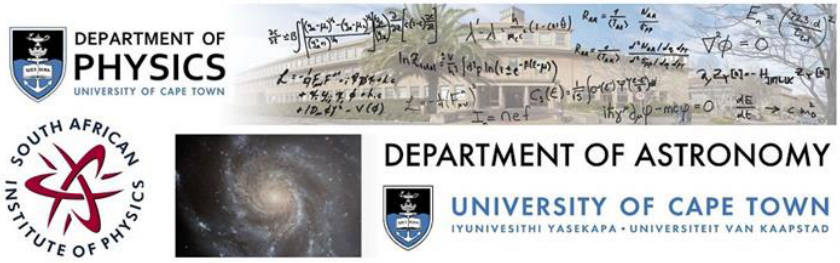

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Heterogeneous powders ID by means of fracture mechanics

Friday, 8 July 2016 14:00 (20 minutes)

Abstract content
   (Max 300 words)
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Toxicology was provocatively defined as a "scientific field in which the core experimental protocols have remained nearly unchanged for more than 40 years". The aim of the presented work is to review, with a new approach, the description of heterogeneous powders, a complex toxic agent.
Starting with asbestos vicissitude, going through the concern on nanotechnologies and the rising need of nano-safety legislation, with the aim to promote a healthy nano-revolution, new approaches in the description of morphologically, structurally, chemically and functionally heterogeneous particle populations are needed.
By means of fracture mechanics, heterogeneous powders can be described with minimal parameters. These parameters can be used to set references on which it is possible to describe several bio-interaction pivotal features such as: adhesion, surface forces and possible reaction path of surfaces. The final aim is an attempt to describe this particle population as a single entity with disparate properties.
For this purpose we have dimensionally studied a mineral powder as is and after two different mechanical stresses: gentle grinding and sonic bath.
Preliminary results shows that using a best fit probability distribution, combined with fracture mechanics theory, it is possible to fully describe many properties of the particles population as a whole. In particular those properties with an influence in the interaction between the subject powder and the bio-sphere.
Testing several mechanical stress exposition time, a relationship between time and maximum probability (curve top-hat) seems to be detectable, allowing to foresee probability distribution and particle dimensional distribution (and related characteristics) for longer time of mechanical stress exposure and also to eventually identify the starting state of the material.

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Primary author: Dr VIGLIATURO, Ruggero (University of KwaZulu-Natal)

Co-authors: Dr MARENGO, Alessandra (University of Torino); Dr BITTARELLO, Erica (University of Torino); Prof. PETRUCCIONE, Francesco (UKZN)

Presenter: Dr VIGLIATURO, Ruggero (University of KwaZulu-Natal)

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