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## Materiallurgy of macadamia nut shell explained using its physical properties

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**Abstract content &nbsp; (Max 300 words)-<a href="http://events.saip.org.za/getFile.py/?target="\_blank">Formatting & Special chars</a>**

Macadamia integrifolia and macadamia tetraphyllia nuts come from trees found in rainforest. In South- Africa, macadamia nuts are found in Limpopo (Venda and Tzaneen), Mpumalanga and Kwa zulu Natal. Their seeds have many therapeutic and nutritional attributes. While essential oil is extracted from the nut seed, the hard nut shells may be used for its high calorific value 19.64 MJ/Kg. Artisanal clay bring makers in the Dididi village of the Nondoni dam (Venda) are using these nuts in conjunction with fire woods to reach the required higher temperature (around 1200 0C) for their firing of clay bricks. Although macadamia was found to have a calorific value similar to that of coal (19.44 Mj/Kg), it has a lower amount of ash. The compressive strength for untreated macadamia nut shell was found to be between 1800 and 4000 N which would make it useful as building material. The fracture force per mean shell thickness of macadamia has been found between 1000–1200 N/mm. Its micro-hardness supported by the physical activation makes it suitable in the production of activated carbon for gold extraction. The chemical activation with citric, with hydrochloric, with sulfuric acid or with sodium hydroxyl makes macadamia nut shells suitable as cations and anions–exchangers for base metals recovery from hydrometallurgical aqueous solutions or for water purification. In addition to the above, the present paper will elaborate on the adsorption isotherms using the thermodynamics, adsorption mechanisms using the physico-chemistry of the nut shell surface and the kinetics for base metals ie Cu, Co and Ni removal from aqueous solutions.

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No

**Level for award<br>&nbsp;(Hons, MSc, <br> &nbsp; PhD, N/A)?**

N/A

**Main supervisor (name and email)<br>and his / her institution**

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