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# The Effect of Acid Leaching towards Particle Size of Rice Husk Silica

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**Abstract.** Rice Husk (RH) is the outer layer of paddy grain and considered as agricultural waste in rice producing countries including Malaysia. Several research works have been done to turn these waste into something valuable as well as helping in the environmental pollution problem when these husks are burnt in the field. RH contains about 20% silica which is an oxide of silicon with a chemical formula of $SiO_2$ besides other elements such as $K_2O$, CaO, MgO and others. Silica is a basic raw material that can be used in many industries including electronics application. This project is done to study the effect of acid-leach towards silica derived from rice husk. Two samples are being prepared, one was washed using tap water. The other sample was washed with hidrocloric acid (HCl). For the first sample, RH was washed thoroughly with tap water several times and followed by distilled water to remove mud, soil, impurities and other contaminants present in the raw material. Then it was dried initially at room temperature for 12 hours followed by electrical oven at temperature 100$^{o}$C to remove water content. For the second sample, RH was washed with 3M HCl acid through reflux technique in the fume cupboard for 2 hours. The RH was washed again to remove the acid and dried at room temperature for 12 hours. Both samples were then transferred into crucible and heated at 900°C for 6 hours in air by an electric furnace to produce WRHA. Then both samples were milled in a high energy milling machine for 20 minutes to turn them into nano sized particle powder. The morphology of the specimens were verified by scanning electron microscopy using a Nova Nanosem 230 Field Emission Scanning Electron Microscope. The elemental analysis of the sintered powder was measured by EDX. The particles size were then examined and analyzed using ImageJ software. The result from ImageJ software shows that for as-milled RH washed with tap water, the average size for particle size is 68 nm whereas for RH with acid leaching, the average size is 26 nm. The result shows that the acid-leached RH has smaller particle size which is about 62% compares to non-acid-leached technique. This RH contains more porosity and the RH pellets are more brittle. This is because the reaction of the chemical with the reactive elements contained in RH such as potassium, magnesium and calcium.

**Keywords:** Rice Husk, Silica, Acid Leaching, Particle Size