# Purification of Vein Graphite by Alkali Roasting for Anode Material for Lithium ion Batteries

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by

**WEWE GEDARA CHANDIMA NILANTHA WEWEGEDARA**

**Mineral Resources and Technology Degree Program**
**Uva Wellassa University, Sri Lanka**

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# Abstract

Lithium Ion Battery (LIB) has been an attractive energy source since its birth because of its advantages over other power sources. Researches are carried out search alternative anode materials as the high cost of production of commercially used synthetic carbonaceous materials. Recent researches have focused to use low cost natural graphite as an anode. However Morphology, surface chemistry and mechanically attached and intercalated impurities in natural graphite govern the electrochemical performance of the natural graphite as an anode martial. Even though Sri Lanka is known for high purity and highly crystalline vein graphite further enhancement of purity is necessary before it is used as anode material. Therefore this study is focused to study the effectiveness of alkali roasting process, which consists of roasting with NaOH at low temperatures, water washing and sulphuric acid leaching to remove the impurity in natural vein graphite.

Purity level of graphite varieties with initial purity above 98% could be upgraded above 99.9% and varieties with initial purity around 95% could be upgraded up to 99.3%. Fe removal shows a direct relationship to the purity enhancement. D.C. electrical conductivity data of treated graphite shows that the vein graphite possesses electrical conductivity sufficient for the anode of LIB. It can be concluded that the alkali roasting purification method is an effective method for purification of Sri Lankan vein graphite and treated graphite is a promising material for the anode application of lithium-ion rechargeable batteries.

*Key words*: Alkali roasting, Purification, Impurities