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ABSTRACTS

Editors

Nanda Balasooriya
Sanjeewa Malaviarachchi

13.45 - 15.30 Technical Session II (Panel D)

Theme: ***Mineral Resources of Sri Lanka - Value Addition and Sustainable Management*** *(The Royal Ballroom)*

Chairpersons : *Dr. H.M.R. Premasiri* ***Rapporteur :*** *Mr. A.M.D.U. Abeysinghe*

Panel Members: *Dr. Nalaka Ranasinghe, Mr. Ashvin Wickramasooriya, Dr. P. Jayasinghe*

13.45-14.00	Petrology, mineralogy and geochemistry of Arangala granite, Sri Lanka *W.M.R.R. Wickramasinghe and H.M.T.G.A. Pitawala*
14.00-14.15	Source of impurities associated with Sri Lankan vein graphite: Implication from gangue minerals *T.C. Senevirathna, H. P. T. S. Hewathilake, P. L. Dharmapriya, N. W. B. Balasooriya, H. M. T. G. A. Pitawala and H. W. M. A. C. Wijayasinghe*
14.15-14.30	Quality Degradation of Sri Lankan Vein Quartz due to Poor Industrial Practices *S.S. Pathirage, P.V.A. Hemalal, L.P.S. Rohitha, Y.P.S Siriwardhana and N.P. Ratnayake*
14.30-14.45	Purely chemical method to synthesize precipitated Calcium Carbonate nanoparticles from impure dolomitic marbles *V.C.M. Somarathna, R.M.G. Rajapakse, M.M.M.G.P.G. Mantilaka and H.M.T.G.A. Pitawala*
14.45-15.00	Synthesis of reduced graphene oxide from Sri Lankan Vein Graphite using Sodium Hydroxide as an eco-friendly alternative *J.N. Kanagaratnam, T.H.N.G. Amaraweera, H.W.M.A.C. Wijayasinghe and N. W. B. Balasooriya*
15.00-15.15	Petrography of rocks of Kahatagaha-Kolongaha Graphite Mine, Wanni Complex, Sri Lanka *N. H. M. C. Nawaratna and L. R. K. Perera*
15.15-15.30	Thonigala Granite is not Post tectonic *M.L.G.N.T. Jayatilaka and L.R.K. Perera*

GSSL-2018-A08

SOURCE OF IMPURITIES ASSOCIATED WITH SRI LANKAN VEIN GRAPHITE: IMPLICATION FROM GANGUE MINERALS

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Possession of highly pure and crystalline vein graphite of Sri Lanka is well-known all over the world. Further, purification can increase the demand of vein graphite usage in high tech applications. Hence, proper identification of impurities present in graphite is much important before selecting a suitable method of purification. The occurrence of vein graphite is caused due to the transportation of carbon-bearing hydrothermal fluid through fracture system of a host rock. When this fluid is uplifted, the impure graphite could be formed due to wall rock interaction and impurities incorporated with the hydrothermal fluid. Therefore, this study focuses to identify the source of impurities incorporated with Sri Lankan vein graphite by employing both chemical and petrographical investigations. The graphite samples were collected from Kahatagaha-Kolongaha mine at 1132ft and 2000ft depth levels. Samples were collected as a series from host rock to middle of the graphite veins. They were crushed using a laboratory disk mill and <53 μm size fraction was separated by using a sieve. Thin sections of wall rock and graphite-wall rock boundary were prepared from selected samples for petrography. The carbon percentage was determined according to the ASTM - 561 by weighing the residue method. Moreover, geochemical analysis of the graphite samples was carried out by Inductively Coupled Plasma (ICP) technique followed by aqua regia partial extraction and lithium metaborate/tetraborate fusion. The carbon content of the graphite samples collected from the middle and at both boundaries are 99.08%, 96.29% and 98.01%, respectively, indicating that the purity of graphite decreases from the middle of the vein towards the wall rock. The major gangue minerals found in the samples are pyrite, quartz, chalcopyrite, calcite, dolomite, feldspar, kaolinite and chlorite. Further, petrographical studies show that the wall rocks, which were collected about 5 m away from the graphite veins, contain quartz, feldspar, garnet, biotite and orthopyroxene as major mineral phases while disseminated graphite, zircon, ilmenite and apatite as accessories. In contrast, the graphite-wall rock boundary shows a highly altered zone with the formation of secondary minerals such as biotite, titanite, calcite, pyrite and feldspars. This may be due to the transportation of hydrothermal fluid through the fracture system of the wall rock or mineral grain boundaries. Therefore, this study reveals that the most of the impurities associated with the graphite were derived from the wall rock itself due to the fluid-wall rock interaction and only a minor amount of impurities may have come along with the hydrothermal fluid.

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Keywords: *Wall rock, Vein Graphite, Hydrothermal fluid, Impurities, Gangue minerals*

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SYNTHESIS OF REDUCED GRAPHENE OXIDE FROM SRI LANKAN VEIN GRAPHITE USING SODIUM HYDROXIDE AS AN ECO-FRIENDLY ALTERNATIVE

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Sri Lankan vein graphite, being renowned for its high crystallinity and high natural purity (95-99 of C%), has a very high potential to synthesize into graphene with comparatively low cost. Chemical reduction of Graphene Oxide (GO) is the most efficient way to produce graphene on large scale, starting with graphite. However, this chemical reduction process has severe limitations as far as the toxicity of the presently used reducing agents are concerned. Hence, an eco-friendly approach of using sodium hydroxide to reduce GO into reduced Graphene Oxide (rGO) was investigated in this study. GO was synthesized by modified Hummer's method and reduced with sodium hydroxide to produce rGO. The prepared GO and rGO were characterized by X-ray Diffractometry (XRD), UV-visible spectroscopy and Fourier Transform Infrared (FTIR) spectroscopy. The XRD results showed that the reducing agent used in this study (NaOH) was highly effective to produce rGO from GO. Further, the FTIR analysis confirmed the successful reduction of oxygen functional groups in rGO. Moreover, the UV absorption peak present at 236 nm in GO had shifted to 263nm as the reduction proceeded. Therefore, this study unravels a successful synthesis of reduced graphene oxide out of Sri Lankan natural vein graphite by chemical reduction using NaOH as the reducing agent. Moreover, it reveals this approach is a simple, easily controllable and alternative eco-friendly method with a great potential for production of rGO in large scale.

Keywords: *Sri Lankan vein graphite, Graphite oxide, Chemical reduction, Reduced graphene oxide*