

Induction of the 88th President and Annual Dinner of the Institute of Chemistry Ceylon - 2025

Chief Guest's Address

Value addition to local mineral resources

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It is both an honour and a privilege to be invited as the Chief Guest for the inauguration of Prof. Hema Pathirana, as the new President of the Institute of Chemistry. I wish to share some thoughts on the use of natural resources, particularly mineral resources from decades of my experience for the economic development of Sri Lanka.

Sri Lanka has an abundance of high quality mineral deposits which have not been effectively utilised for the economic development of the country. While some have not been exploited to their full potential, others are sold at a pittance to overseas buyers. Our industrial policies have never entailed using mineral resources for economic development.

Exploitation of mineral resources without the concomitant development of a chemical industry is meaningless; neither is possible without the other. At the present time we do not have a single chemical industry in Sri Lanka going by the true definition of "chemical industry". When the Paranthan chemical factory was functioning, we manufactured caustic soda for the soap industry and even manufactured hydrochloric acid and chlorine for a brief period. Similarly, this factory had the capacity to produce hydrochloric acid and also bleaching powder used for the chlorination of our water supplies. These can be conveniently manufactured in Sri Lanka if we plan an integrated chemical industry. Commissioning a sulphuric acid plant can supply the requirement for a superphosphate plant to manufacture phosphate fertiliser from Eppawela apatite. In addition, such a plant could provide the acid required to fill the lead acid batteries used in vehicles which we import at the present time. Sulphuric acid is one of the cheapest acids since the raw material sulphur removed from petroleum at refineries is available at a very cheap price. Some examples of mineral resource utilization are given below.

1. Eppawela phosphate deposit to produce superphosphate fertiliser.

If we produce sulphuric acid, then it is possible to produce single superphosphate from apatite which can then be used to supply all our phosphate fertiliser requirements. Lanka Phosphate Ltd. produced 20 tons of single superphosphate (SSP) using a second hand steel container and a wooden paddle by mixing the mined ore from Eppawela with sulphuric acid. These were tested in all agricultural regions of the country. The SSP produced was found to be better even compared to the imported triple superphosphate (TSP) because the SSP contained sulphur in addition to phosphate and sulphur is an essential nutrient to plants. What is attractive is that the whole cost can be recovered in about 3 years while providing phosphate fertiliser at half the current selling price.

2. Value addition to mineral sands

Another mineral based industry that could be developed is the mineral sands industry. At the moment we export mineral sands such as rutile and ilmenite at cheap prices to overseas companies. These can be converted to pigment grade titanium dioxide by digesting these minerals with sulphuric acid. There is a novel and a more economical process using autoclaving the mineral with sulphuric acid at a low temperature.

3. Monazite and rare earths

We have an abundance of a deposit of monazite containing thorium and rare earths at Beruwela. Thorium found in monazite can be used in the production of nuclear fuels. At one time we had a small processing plant at Katukurunda for processing monazite and the rare earth phosphates of lanthanum, cerium and yttrium found in this type of sand. There is a great demand for rare earths since these metals are used

as magnets and as sensors in the electronics industry. Beneficiation and separation of the rare earths can have a positive economic impact considering the current demand. In the actual process monazite is treated with concentrated sulphuric acid at about 230 °C and the rare earth sulphates so formed are separated by a complex process of precipitation, solvent extraction and chromatography.

Another mineral which needs attention is thorianite, an extremely pure form of thorium oxide which was exported from Sri Lanka during early 1900's from mines at Nelluwa in the Galle district. Marie Curie's fundamental work on radioactivity was based on thorianite from Ceylon. Some other discoveries using our thorianite are; the radioactive decay law, discovery of polonium and radon. The Sri Lankan origin of thorianite is clearly mentioned in her published research papers. If thorianite can be mined, then its export will give dividends particularly because thorium based nuclear fuels are now studied as an alternative to uranium fuels.

4. Quartz

High quality quartz is found from many locations in the country and these are currently exported in the raw form without any value addition. It is the raw material used in producing silicon used for the huge semiconductor industry. Silicon production from quartz in Sri Lanka is not economical since it is technologically very complex and the electricity requirements are very high. However, there are many other smaller industries which can be started with quartz as the raw material such as water glass (sodium silicate), quartz lenses and other quartz glass items which involve simple melting and reforming of quartz.

5. Graphite based industries

There are a number of other minerals where value addition can be carried out in Sri Lanka. The best quality graphite in the world has always come from Sri Lanka and only about 5% of the total graphite mined is used in Sri Lanka. Also, the Ceylon Ceramics Corporation at one time had a small crucible factory where graphite was used to make crucibles for the foundry industry. This industry too died as a result of the post 1977 economic liberalisation policy. All graphite we mine now is

exported and we buy the finished products of graphite such as carbon brushes for motors and electrodes for dry batteries from abroad at exorbitant prices. Sri Lanka can do well by starting a graphite based industry to manufacture carbon brushes, electrodes for torch batteries and graphite greases. Several methods are available for the exfoliation of graphene from graphite. Graphene and graphene oxide are two recent products with commercial applications.

6. Iron industry

There was a well-developed iron industry in Sri Lanka before the British Colonial times. Archaeological evidence points out to a well organised steel industry dating as far back as 1200 A.D. long before Europe's first bellow driven iron manufacturing plants came into operation. There is evidence for a large steel manufacturing facility in the southern slopes of the Samanalawewa area where wind tunnels were used to create the high temperatures required for the iron making process. A British archaeologist working in the Samanalawewa area actually produced iron by reconstructing such wind tunnels using iron ore available here. Recently a good quality magnetite ore has been discovered off Buttala by geologists of the University of Peradeniya. This ore contains about 60–70% iron in quite a pure form and found at the surface and far superior in quality to already recorded iron ore deposits found elsewhere in the country. Even if we export this ore without value addition, we can earn valuable foreign exchange.

The possibility of starting an iron industry using the magnetite ore along with limestone should be explored.

7. Limestones and precipitated calcium carbonate

The drug industry uses magnesium carbonate and calcium carbonate as bulking components of drugs. Our dolomite can be exploited for this purpose. Toothpaste manufacture also involves calcium carbonate and we import nearly 100,000 tons of precipitated calcium carbonate per year and it is a crime to spend so much for importing calcium carbonate because we have ample deposits of calcium carbonate. We have a calcite deposit at Balangoda which is pure calcium carbonate. Precipitated calcium carbonate required by many

industries can be made starting with this deposit of calcite.

8. Other mineral resources

One interesting mineral deposit is the iron pyrites ore at Panirendawa in the Seruvila area. This is the only sulphur containing mineral found in Sri Lanka and the only one with copper. This is a neglected resource, and these pyrite ores usually also have gold in its composition. Gold plating of pinnacles of stupas is where gold has been used from Sri Lanka. In addition, gold nuggets are found at Balangoda in the Walave river and its tributaries.

There is also an often neglected mineral at Ussangoda area at Hambantota. Here we can find greenish rocks of serpentinite containing nickel and even the red soil is rich in nickel. A simple process to extract nickel using sulphuric acid can produce nickel sulphate which can be directly used in nickel plating: For example nickel plating of pesticide tanks already carried out in Sri Lanka uses imported nickel sulphate.

I wish all the best to the newly inducted President Professor Emeritus Hema Pathirana and to the Institute of Chemistry to achieve all its targets.



Prof. O. A. Ileperuma was a Senior Professor in the Department of Chemistry of University of Peradeniya and retired in 2014. His distinguished career in academia was also enriched with numerous contributions to the university administration by serving as the Head of the Department of Chemistry, Dean of the Faculty of Science and a Council member of University of Peradeniya. His active involvement in various national services is also remarkable. Considering his outstanding contributions as an academic he was appointed as an Emeritus Professor by the University of Peradeniya. He is an Inorganic Chemist having over 70 publications in International journals. Currently he is serving the University of Peradeniya as a member of the council and serves as a resource person for its development activities.

CHEMISTRY IN SRI LANKA

Chemistry in Sri Lanka is a tri-annual publication of the Institute of Chemistry Ceylon and is published in January, May and September of each year. It is circulated among the members of the Institute of Chemistry and students of the Graduateship/DLTC course and libraries. The publication has a wide circulation and more than 500 copies are published. Award winning lectures, abstracts of communications to be presented at the annual sessions, review papers, activities of the institute, membership news are some of the items included in the magazine.

The editor invites from the membership the following items for publication in the next issue of the *Chemistry in Sri Lanka* which is due to be released in January 2026.

- Personal news of the members
- Brief articles of topical interests
- Forthcoming conferences, seminars and workshops
- Latest text books and monographs of interest to chemists

All publications will be subjected to approval of the 'Editorial and Publicity Committee' and the Council of the Institute of Chemistry Ceylon.

Further, prospective career opportunities for chemists, could be advertised in *Chemistry in Sri Lanka* at a nominal payment. The editor in charge welcomes suggestions from the members for improvement of the publication.