PROPOSAL FOR A NEW FIELD OF TECHNICAL ACTIVITY	
Circulation date: Closing date for voting:	Reference number (to be given by Central Secretariat) **ISO/TS/P 250**
Proposer SAC	

A proposal for a new field of technical activity shall be submitted to the Central Secretariat, which will assign it a reference number and process the proposal in accordance with the ISO/IEC Directives (part 1, subclause 1.5). The proposer may be a member body of ISO, a technical committee or subcommittee, the Technical Management Board or a General Assembly committee, the Secretary-General, a body responsible for managing a certification system operating under the auspices of ISO, or another international organization with national body membership. Guidelines for proposing and justifying a new field of technical activity are given in the ISO/IEC Directives (part 1, Annex C).

The proposal (to be completed by the proposer)

Title of the proposed new committee (The title shall indicate clearly yet concisely the new field of technical activity which the proposal is intended to cover.)

Rare earth

Scope statement of the proposed new committee (The scope shall precisely define the limits of the field of activity. Scopes shall not repeat general aims and principles governing the work of the organization but shall indicate the specific area concerned.)

Standardization in the field of rare earth ores, concentrates, metals, alloys, compounds, materials, including the reuse and recycling of waste rare earth products.

Proposed initial programme of work (The proposed programme of work shall correspond to and clearly reflect the aims of the standardization activities and shall, therefore, show the relationship between the subjects proposed. Each item on the programme of work shall be defined by both the subject aspect(s) to be standardized (for products, for example, the items would be the types of products, characteristics, other requirements, data to be supplied, test methods, etc.). Supplementary justification may be combined with particular items in the programme of work. The proposed programme of work shall also suggest priorities and target dates.

The proposer plans to develop a three-category standard system for the full life cycle of rare earth, the first category being basic standards; the second, testing and analysis standards; and the third, rare earth product standards.

1. Category 1 – Basic standards
   – Terms and definitions
   – Designation system
   – Packing, marking, transport and storage
2. Category 2 – Testing and analysis standards
   – Chemical analysis of rare earth concentrates, metals and materials
   – Determination of particle size and specific surface area of rare earth compounds
3. Category 3 – Product standards
   – Rare earth product standards, from concentrates to materials, including reuse and recycling aspects.

Priorities will be given to the items listed in the first and second categories, because common understanding of definitions and common testing methods are essential for producers and users of rare earths globally. They are the base for the standardization of rare earths internationally.

The proposer would like to set the target date of the NPs by the end of 2016 in the hope that the establishment of a new TC would be approved without significant delay.

Standardization of rare earth products work will start once definition and testing methods are outlined.

See overleaf

Indication(s) of the preferred type or types of deliverable(s) to be produced under the proposal (This may be combined with the "Proposed initial programme of work" if more convenient.)

Deliverables ideally include all ISO International Standards (ISs) and documents at all levels.

1. ISO standard "Terms and definitions of rare earth" and "Designation system of rare earth", both of which might be multi-part series, including the definition of rare earth ores and concentrates; rare earth metals, alloys and compounds; rare earth functional materials; and rare earth reuse and recycling.
2. ISO standard "Packing, marking, transport and storage of rare earth products".
3. ISO standard "Test method for chemical analysis of rare earth metals and oxides, determination of non-rare earth impurities of aluminum, chrome, manganese, iron, cobalt, nickel, copper, zinc, and lead", which could contain two methods of ICP-AES and ICP-MASS.
4. ISO standard "Test method for chemical analysis of rare earth metals and compounds, determination of total rare earth content", which could contain two methods of gravimetry and EDTA titration.
5. ISO standard "Test method for chemical analysis of rare earth metals and oxides, determine at ion of rare earth oxide impurities", which will contain a 15-part series.

A listing of relevant existing documents at the international, regional and national levels. (Any known relevant document (such as standards and regulations) shall be listed, regardless of their source and should be accompanied by an indication of their significance.)

There are no ISO documents that directly describe rare earth, but there is a standard, ISO2355:1972, that covers the testing method of magnesium-based alloys with rare earth compositions within the range of 0.2%-10%.
ISO2355:1972 (en) *Chemical analysis of magnesium and its alloys – Determination of rare earths – Gravimetric method*

There is an IEC standard CEI-IEC 60404-8-1 that describes hard magnets, which contains information on rare earth permanent magnets of NdFeB and samarium cobalt alloy.
CEI-IEC60404-8-1 *Specifications for individual materials – Magnetically hard materials.*

China has built a relatively full standard system for rare earths, containing more than 200 national standards (GB) and industrial standards (XB).

Chinese national standards, for example:
1. GB/T15676-1995 *Terms and definitions for rare earths*
2. GB/T17803 *Rare earth designation system*
3. GB/T12690 *Chemical analysis method for non-rare earth impurities of rare earth and their oxides (18 series)*
4. GB/T14635-2008 *Chemical analysis method for rare earth metals and compounds determination of total rare earth content*
5. GB/T18115 *Chemical analysis method for rare earth impurities in rare earth metals and oxides (15 series)*
6. GB/T13560 *Materials for sintered NdFeB permanent magnets*
7. GB/T26412 *RE-base AB_5 hydrogen storage alloy powder used in negative pole of nickel metal hydride batteries*
8. GB/T5240 *Neodymium oxide*
9. GB/T13558 *Dysprosium oxide*
10. GB/T15677 *Lythanium metal*

Chinese industrial standards, for example:
1. Neodymium fluoride
2. Chemical analysis method for rare earth fluoride – Determination of fluoride

The former Soviet Union developed nearly 30 rare earth standards in the late70s, but there is no report available on the revision of these standards.
For example:
1. Г OCT23862.0:1979 *General requirements for analysis method of rare earth metals and oxides*
2. Г OCT23862.1:1979 *Rare earth metals and oxides, determination of rare earth oxide impurities by spectrometry*

A statement from the proposer as to how the proposed work may relate to or impact on existing work, especially existing ISO and IEC deliverables. (The proposer should explain how the work differs from apparently similar work, or explain how duplication and conflict will be minimized. If seemingly similar or related work is already in the scope of other committees of the organization or in other organizations, the proposed scope shall distinguish between the proposed work and the other work. The proposer shall indicate whether his or her proposal could be dealt with by widening the scope of an existing committee or by establishing a new committee.)

Because there is currently no TC or PC on rare earth within ISO or IEC, work of the new rare earth committee, should it be approved, would not conflict with existing work of ISO and IEC, but would widen the scope of ISO work on metals.

However, considering that rare earth is a series of elements often referred to as "industrial vitamin" and commonly added to metals such as magnesium, aluminum and iron to make alloys, it should be linked to ISO/TC 79 *Light metals and their alloys*, and ISO/TC 132 *Ferroalloys*, as joint working groups to develop chemical analysis standards on metal alloys containing rare earth.

It is worth noting that rare earth alloys covered by the new rare earth TC will concern master alloys, with rare earth contents usually higher than 20% which are then added to other metals (usually magnesium, aluminum and iron) to produce terminal alloys. These terminal alloys contain less than 10% rare earth. Work of the new TC therefore seems to differ from that of existing ISO TCs.

In addition, liaison with IEC/TC 68 *Magnetic alloys and steels* should be made because rare earth permanent magnets are now part of hard magnets, which are now covered by IEC/TC 68. A joint working group should be created when reviewing standards or developing new standards for these products.

ISO/TMBG ISO guide 82: 2014 "*Guidelines for addressing sustainability in standards"* section C2- C.2 *Assessing and establishing provisions related to efficient use of natural resources within a specific standard*, will be the guide for drafting all deliverables of the new TC on rare earths.

A listing of relevant countries where the subject of the proposal is important to their national commercial interests.

China, USA, Japan, France, Vietnam, Canada, Australia, Malaysia, India, the Commonwealth of Independent States (CIS), Kazakhstan, Mongolia, South Africa, etc.

A listing of relevant external international organizations or internal parties (other ISO and/or IEC committees) to be engaged as liaisons in the development of the deliverable(s). (In order to avoid conflict with, or duplication of efforts of, other bodies, it is important to indicate all points of possible conflict or overlap. The result of any communication with other interested bodies shall also be included.)

Information exchange and references should be reviewed, especially concerning all deliverables on rare earth permanent magnets, with IEC/TC 68 *Magnetic alloys and steels*. The same should be done for the chemical analysis of alloys containing rare earth, with ISO/TC 79 *Light metals and their alloys* and ISO/TC 132 *Ferroalloys*.

A simple and concise statement identifying and describing relevant affected stakeholder categories (including small and medium sized enterprises) and how they will each benefit from or be impacted by the proposed deliverable(s).

The stakeholder categories range from rare earth producers to consumers and traders. Producers include: China Northern Rare Earth Group High-Tech Co Ltd.; Moly Corp., USA; Lynas Corp. Ltd., Australia; Indian Rare Earth Ltd.; and Kuantan smelter, Malaysia. The number of stakeholders, which are generally small-to-medium sized users, is quite difficult to quantify. There are hundreds of companies in China involved in rare earth production and most of them are small-sized.

Rare earth consumers are numerous globally, with the majority of them focusing on specific sectors: permanent magnets, green lighting products, electric and household appliances, vehicle catalysts, etc.

There is no doubt that all stakeholders will benefit from the development of international standards on rare earth terms and definitions, designation systems, testing methods, and technical requirements concerning the composition of products, as well as packaging, transportation, etc. This will help them reach consensus in production and trade, by promoting exchange of rare earth technologies globally, and therefore result in great social value and with an added advantage of creating behind the scenes commercial value.

An expression of commitment from the proposer to provide the committee secretariat if the proposal succeeds.

China would like to hold the TC secretariat, should the proposal be accepted by ISO.

Purpose and justification for the proposal. (The purpose and justification of the standard to be prepared shall be made clear and the need for standardization of each aspect (such as characteristics) to be included in the standard shall be justified. Clause C.4.12.1 through C.4.12.10 of Annex C of the ISO/IEC Directives, Part 1 contain a menu of suggestions or ideas for possible documentation to support and purpose and justification of proposals. Proposers should consider these suggestions, but they are not limited to them, nor are they required to comply strictly with them. What is most important is that proposers develop and provide purpose and justification information that is most relevant to their proposals and that makes a substantial business case for the market relevance and the need for their proposals. Thorough, well-developed and robust purpose and justification documentation will lead to more informed consideration of proposals and ultimately their possible success in the ISO IEC system.)

1. What is rare earth?

Rare earth elements are a group of very active elements. As defined by the IUPAC, a rare earth element (REE) or rare earth metal, is one of a set of seventeen chemical elements in the periodic table, specifically the fifteen lanthanides plus scandium and yttrium, which have unique performance properties in magnets, lighting, catalysts, etc. Few things have had as significant an impact on modern technology as rare earth materials. These advanced elements are widely used in wind turbines, solar panels, hybrid cars, electric car batteries, and lighting products. Rare earth plays an increasingly important role throughout development across the globe.

2. Diversification of the rare earth supply

More and more countries have become aware of the importance of rare earth in their supply chains. Some of them, such as the US, Australia and India, have resumed or began rare earth production in the past five years. Moly Corp restarted its rare earth facility at Mountain Pass, California, USA, and Lynas Corporation Ltd. developed an integrated mine-to-market rare earth process. The world rare earth supply pattern is now becoming diversified.

3. Rare earth in China

China is now the biggest supplier and consumer in the world. It produces about 80kt rare earth oxide each year, equivalent to its domestic consumption. Exports from the country represent about 20kt per year, and go mainly to Japan, the US, Italy, Vietnam, France, Germany and others.

China started producing rare earth in the late 50s and began standardization on rare earth in the 70s. It now has a nearly full standard system with multi-layers, including a basic layer of terms and definitions, designations, packing, marking, transport and storage, a testing method layer for rare earth concentrates and materials, and a product-series layer for the full lifecycle of rare earth.

4. The need to develop international standards for rare earth

As mentioned above, more and more countries are becoming aware of the importance of rare earth in their supply chain and the rare earth production pattern is diversifying globally. However, the terminology and classification of rare earth-related products and testing methods have not yet been internationally defined. It is time to establish a new rare earth ISO TC to develop international rare earth standards and help the world rare earth community use a “common language".

Summary: The purpose of this proposal is to initiate the development of international standards on rare earth materials to promote the production and fair trade of rare earth globally, and ensure the sustainable procurement of rare earth resources.

Signature of the proposer LI Yubing, SAC

Further information to assist with understanding the requirements for the items above can be found in the Directives, Part 1, Annex C.

Comments of the Secretary-General (to be completed by the Central Secretariat)

Signature