Summary of Risk Assessment Conducted Pursuant to subsection 83(1) of the *Canadian Environmental Protection Act, 1999*

New Substances Notification 19473: Aluminum magnesium vanadium oxide (Chemical Abstracts Service Registry Number 170621-28-0)

Regulatory decisions

Under the provisions for Substances and Activities New to Canada in Part 5 of the *Canadian Environmental Protection Act, 1999* (CEPA), and pursuant to section 83 of the Act, the Minister of the Environment and the Minister of Health have assessed information in respect of the substance, and determined, based on the available information, that when used as notified, the substance is not anticipated to enter the environment in a quantity or concentration or under conditions that have or may have an immediate or long term harmful effect on the environment or its biological diversity, constitute or may constitute a danger to the environment on which life depends, or constitute or may constitute a danger in Canada to human life or health.

The significant new activity (SNAc) provisions of CEPA were applied to the substance because of potential environmental and human health impacts that could arise as a result of potential new activities. Order 2021-87-14-01 Amending the Domestic Substances List outlines information requirements for those activities and was published in the *Canada Gazette* Part II, Vol. 156, No. 1 on January 5, 2022. Notification is required prior to commencement of those activities identified as a potential concern to ensure the substance undergoes further assessment and risk management consideration.

Substance identity

The notified chemical is aluminium magnesium vanadium oxide (Chemical Abstracts Services Registry Number[1] 170621-28-0). It is an inorganic mixed-metal oxide complex.

Notified and potential activities

The substance is proposed to be imported into Canada in quantities greater than 10 000 kg/yr for the notified use as an industrial catalyst. Potential uses may include humidity sensors, photoluminescent materials and laser imaging applications.

Environmental fate and behaviour

[1] The Chemical Abstracts Service Registry Number is the property of the American Chemical Society and any use or redistribution, except as required in supporting regulatory requirements and/or for reports to the Government of Canada when the information and the reports are required by law or administrative policy, is not permitted without the prior, written permission of the American Chemical Society.

Based on its physical and chemical properties, if the substance is released to the environment, it will tend to partition to water and sediments. The substance is not expected to be persistent based on observed transformation/dissolution in water. However, the transformation products are metallic species that are expected to be persistent in water and sediments. The substance and its transformation products are not expected to bioaccumulate based on bioconcentration factors of 400-1365 L/kg for aluminum, determined in Environment and Climate Change Canada and Health Canada's Priority Substances List Assessment Report for Aluminum Salts, and 5-333 L/kg for vanadium, based on the Federal Environmental Quality Guidelines for vanadium.

Environmental risk assessment

Based on the available hazard information, the substance has moderate acute toxicity in aquatic invertebrates and algae (median effective loading rate in the range of 1-100 mg/L), low acute toxicity in fish (no adverse effects observed in saturated solutions), and moderate chronic toxicity in aquatic invertebrates (no-observed-effect-loading rate (NOELR) in the range of 0.1-10 mg/L). Using the NOELR from the most sensitive organism (aquatic invertebrates) and by applying an assessment factor of 10 to account for species sensitivity variation and mode of action, the predicted no-effect loading rate (PNEL) was calculated to be in the range of 10-100 µg/L, which was used to estimate the ecological risk.

The notified and other potential activities in Canada were assessed to estimate the environmental exposure potential of the substance throughout its life cycle. Environmental exposure from the notified activity is expected to be mainly from industrial processing by release to air, with subsequent deposition to surrounding land and water bodies, resulting in an predicted environmental loading rate (PEL) of less than 10 µg/L. However, if the substance is manufactured in Canada, an increased exposure potential may exist from aquatic releases that could result in a PEL in the range of 100-1000 µg/L.

Comparing the PEL for the notified use with the PNEL, the ratio is less than 1. This, along with other lines of evidence including environmental fate, hazard, and exposure, indicates that the substance is unlikely to cause harm to the environment in Canada.

However, the manufacturing of the substance in Canada may significantly alter environmental release and exposure resulting in the substance becoming harmful to the environment. Consequently, more information is necessary to better characterize potential environmental risks.

Human health risk assessment

Based on the available hazard information, the substance has a low acute toxicity by the oral, dermal and inhalation routes (oral and dermal median lethal doses >2000 mg/kg body weight; inhalation median lethal concentration >5 mg/L/4 hours) and low subchronic toxicity following repeated oral doses in mammalian test animals (28-day no-observed-adverse-effect level >300 mg/kg-bw/day). It is not a skin sensitizer (>10 % estimated concentration required to produce a

stimulation index of 3 (local lymph node assay)). It is not expected to be mutagenic *in vitro* and is not clastogenic *in vitro* or *in vivo*. Therefore, the substance is unlikely to cause genetic damage.

When the notified substance is used as a catalyst, direct exposure of the general population is not expected due to the industrial nature of the use. Indirect inhalation exposure of the general population from ambient air is expected to be at levels of less than 0.1 µg/m^3 at a distance of 1 km away from any industrial release sources; this is considered to limit public exposure. If the substance is used in other industrial or commercial products, such as humidity sensors, photoluminescent materials and laser imaging applications, direct and indirect exposure of the general population is expected to be similar to that of the notified use.

Based on the low toxicity when produced at the notified size and the low potential for exposure, and considering other available lines of evidence, the substance is not likely to pose a significant health risk to the general population, and is therefore unlikely to be harmful to human health.

However, the potential manufacturing of the substance at the nanoscale could significantly alter the exposure and/or conditions of use resulting in the substance becoming harmful to human health. Consequently, more information is necessary to better characterize potential health risks associated with these activities.

Nanomaterial considerations

While the substance was not notified with a particle size on the nanometer scale, there is evidence that it may be available industrially, commercially or in consumer products manufactured at the nanoscale. The available information was determined to be inadequate to assess the risks associated with the substance if it were manufactured at the nanoscale. Find more details on the term “manufactured” in the Policy Statement on Health Canada's Working Definition for Nanomaterial.

Additional information is being requested for this activity since substances in the 1-100 nanometer size range may exhibit significantly different physical chemical properties, environmental fate, toxicity, and exposure potential. Consequently, more information is necessary to better characterize potential environmental and/or health risks.

Assessment conclusion

When the substance is used as notified, it is not suspected to be harmful to human health or environment within the meaning of the criteria under section 64 of the Act. However, it is suspected that a significant new activity in relation to the substance could result in the substance meeting those criteria.

Additional information is required to further evaluate potential environmental risks should the substance be manufactured in Canada. In addition, due to the potential risk to the environment or human health if the substance is manufactured in Canada at the nanoscale, a SNAc order was issued to obtain information for further assessment before these potential activities are undertaken. SNAc Notice No. 19473 was published in the *Canada Gazette* Part II, Vol. 156, No. 1 on January 5, 2022.

A conclusion under CEPA, on this substance, is not relevant to, nor does it preclude an assessment against the hazard criteria for Workplace Hazardous Materials Information System that are specified in the *Controlled Products Regulations* or the *Hazardous Products Regulations* for products intended for the workplace.