

## How EPA Reviews Mixed Metal Oxides Used in Battery Cathode Active Materials

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The U.S. Environmental Protection Agency (EPA) has provided new insight into how it reviews mixed metal oxides (MMOs), including cathode active materials (CAMs) and modified or doped CAMs, under the Toxic Substances Control Act (TSCA). In an April 24, 2026, proposed significant new use rule (SNUR), EPA cited a group of technical and policy documents—some newly posted on EPA's [New Chemicals Division Reference Library](#)—that describe EPA's standardized approach to evaluating and managing risks from certain MMO CAMs used in lithium-ion batteries. [91 Fed. Reg. 22075](#).

The proposed SNUR is important for battery material manufacturers, battery manufacturers, importers, processors, recyclers, and companies developing next-generation battery chemistries. EPA received approximately 25 premanufacture notices (PMNs) and significant new use notices (SNUNs) for MMO CAMs from December 2022 through January 2026, reflecting substantial innovation in this area. EPA indicates that, for future in-scope MMO CAM PMNs and SNUN submissions, it is likely to reach similar conclusions regarding potential human health and environmental risks, and that EPA may rely on a standardized scientific assessment rather than preparing full case-specific technical assessments for each submission.

### Background: Why EPA Is Focused on MMO CAMs

MMOs are metal oxide materials used in a range of electrical applications. In lithium-ion batteries, CAMs are the key chemical raw materials used to produce the cathode in battery cells, which are then assembled into batteries. EPA describes MMO CAMs as crystallized metal oxides typically composed of lithium, cobalt, nickel, and other metal oxide modifiers added to improve battery performance.

EPA has long taken the position that MMOs, including CAMs and modified CAMs, are “chemical substances” subject to TSCA. In its [October 2022 compliance advisory](#), EPA reaffirmed that anyone who plans to manufacture, including import, an MMO, CAM, or modified CAM that is not on the TSCA Inventory must comply with TSCA section 5 new chemical requirements. EPA also stated that modified CAMs are not generally exempt as mixtures. EPA's webpage, [Integrated Approach for Mixed Metal Oxides New Chemicals Review](#), similarly states that new MMOs and modified CAMs not listed on the TSCA Inventory are subject to TSCA section 5 PMN requirements.

EPA's primary concern appears to be exposure to MMO CAM powders. Those exposures may occur during early lifecycle activities, such as powder manufacture and battery material processing, and later during end-of-life activities, including recycling or reclamation when batteries or battery-containing materials are shredded or otherwise processed. EPA's [Standardized Risk Management](#)

[Policy](#) expressly treats recycling or reclaiming substances from batteries or other items containing the new chemical substance as “processing” and states that dust-control, worker-protection, air-release, water-release, and monitoring requirements will apply during recycling or reclamation activities.

## The April 24 Proposed SNUR

EPA’s April 24 proposal would establish SNURs for two generically identified cobalt lithium manganese nickel oxide, metals-doped substances associated with 12 PMNs. EPA states that the PMN substances are types of MMOs covered by EPA’s standardized MMO CAM analysis. The proposed SNUR identifies concerns for carcinogenicity, reproductive toxicity, specific target organ toxicity, dermal and respiratory sensitization, and aquatic toxicity at concentrations from 1-5 ppb. The underlying TSCA section 5(e) orders include restrictions. The proposed SNURs would designate as significant new uses activities conducted in the absence of protective measures, including:

- Use only in the manufacture of batteries;
- Battery or package labeling indicating that the battery contains substances subject to TSCA restrictions, including for recycling and reclamation;
- Dust controls with an overall minimum capture and control efficiency of 99%;
- Restrictions on air releases, including an interim fenceline concentration limit for cobalt-containing MMO substances;
- No release to water;
- Disposal only by the Resource Conservation and Recovery Act (RCRA) Subtitle C hazardous waste landfill or incineration with ash disposed in a RCRA Subtitle C hazardous waste landfill;
- Worker exposure monitoring and respiratory protection requirements; and
- Hazard communication, personal protective equipment, engineering controls, and administrative controls.

The article exemption language is also notable. The proposed regulatory text states that the requirements do not apply once the substance has been incorporated into an “article,” except for battery labeling requirements. However, EPA adds that the article exemption applies only unless and until the article has been shredded or processed such that dust is generated; once the article has been handled in a way that creates potential exposure to or release of the substance, the article exemption no longer applies.

Comments on the proposed rule were originally due May 26, 2026, but EPA recently [extended](#) the comment period to **July 10, 2026**.

## EPA’s MMO CAM Documents

The proposed SNUR appears to be the first Federal Register notice to identify and rely on this package of EPA MMO CAM assessment and risk-management documents. The documents are now

available in the rulemaking [docket](#) and in EPA's [New Chemicals Division Reference Library](#). They include:

- [Applicability of the Toxic Substances Control Act to Mixed Metal Oxides, which include Cathode Active Materials \(CAMs\) and Modified CAMs](#) — October 2022. This compliance advisory states EPA's position that MMOs, CAMs, and modified CAMs are chemical substances subject to TSCA and that modified CAMs are not generally exempt as mixtures.
- [New Approach for Evaluating the Bioaccumulation Potential of Metals in the New Chemicals Division](#) — January 13, 2025. This document explains EPA's weight-of-evidence approach for evaluating metal bioaccumulation, rather than relying on traditional lipid-based bioconcentration or bioaccumulation factors developed for organic chemicals. For cobalt, EPA concludes that all three lines of evidence support low concern for bioaccumulation in aquatic food webs.
- [New Chemicals Division's Approach to Evaluating the Environmental Fate of Mixed Metal Oxides](#) — November 14, 2025. This guidance describes EPA's standard environmental fate assumptions for MMOs, including very strong sorption to sludge, soil, and sediment; negligible migration to groundwater for parent MMOs; a P3 persistence rating; and bioaccumulation rating of B\*low for parent MMOs. EPA states that no Organization for Economic Co-operation and Development OECD testing is recommended for parent MMO fate endpoints, but water solubility or dissolution data may help refine the assessment of free metals.
- [Time-Limited Use of a Respirator with an Assigned Protection Factor of 1000 for Industrial Hygiene Monitoring for MMOs in CAMs and General Population Exposure Considerations](#) — February 26, 2026. This memorandum supports EPA's policy of allowing APF 1000 respirators during initial industrial hygiene monitoring, for a period not to exceed one year. EPA focuses on cobalt as the most potent common component of cobalt- and nickel-containing MMO CAMs. It concludes that APF 1000 protection is expected to reduce worker inhalation exposures to levels unlikely to cause adverse noncancer respiratory effects during the monitoring period.
- [EPA's Approach for Assessing Environmental Hazard of Cathode Active Material New Chemical Substances using Standard Toxicity Profiles](#) — February 26, 2026. This memorandum explains EPA's use of standard toxicity profiles for common MMO CAM metals, adjusted for metal composition, to assess aquatic hazard. EPA states that lithium, cobalt, nickel, yttrium, and aluminum may result in high environmental hazard above specified composition benchmarks.
- [Standardized Scientific Assessment for Mixed Metal Oxide \(MMO\) Cathode Active Materials \(CAMs\) in Battery Applications for Use in TSCA Section 5 New Chemical Reviews](#) — March 2026. This document is EPA's core standardized assessment for in-scope MMO CAMs. These include non-nano-sized, cobalt- and nickel-containing CAMs used in high-volume battery applications. It describes the fate, human health hazard, environmental hazard,

release/exposure, and risk-characterization assumptions EPA expects to apply in TSCA section 5 reviews, including P3/B\*low fate ratings for parent MMO CAMs, cobalt-based inhalation values, high aquatic hazard assumptions, and lifecycle exposure scenarios covering manufacture, processing, battery production, recycling, and end-of-life batteries.

- [Policy on Standardized Scientific Assessment for Mixed Metal Oxide \(MMO\) Cathode Active Materials \(CAMs\) in Battery Applications for Use in TSCA Section 5 New Chemical Reviews](#) — March 13, 2026. This policy memorandum explains EPA's plan to use a standardized scientific assessment for non-nano-sized MMO CAMs that contain cobalt and nickel and are used in battery applications at high production volumes. EPA states that, for many in-scope submissions, it may be unnecessary to prepare individual risk assessments because those assessments would replicate work already done for recent MMO CAM submissions.
- [Policy on Standardized Risk Management for Mixed Metal Oxide \(MMO\) Cathode Active Materials \(CAMs\) in Battery Applications for Use in TSCA Section 5 New Chemical Reviews](#) — March 13, 2026. This policy memorandum describes EPA's expected risk-management terms for in-scope MMO CAM PMNs and SNUNs, including section 5(e) orders, follow-on SNURs, dust controls, PPE, occupational monitoring, air-release limits, water-release prohibitions, hazard communication, recycling-related controls, and disposal restrictions.

## Why This Matters

EPA's release of these documents gives companies a clearer view into what has previously been a relatively opaque review process for MMO CAM PMNs and SNUNs. The documents suggest that, for in-scope cobalt- and nickel-containing MMO CAMs used in high-volume battery applications, EPA is likely to begin with a standardized set of hazard, fate, exposure, and risk-management assumptions.

That predictability may be helpful to PMN and SNUN submitters preparing new chemical submissions. At the same time, the standardized approach may result in restrictive section 5(e) orders and SNURs unless submitters provide data or site-specific information sufficient to support a different outcome. EPA's risk management policy states that EPA may modify prohibitions or limitations if it receives additional testing, studies, reports, or other information showing that the restrictions are no longer necessary, or that additional restrictions are needed.

## What Companies Should Do Now

Companies that develop, import, process, use, recycle, or reclaim MMO CAMs should consider the following steps.

1. Companies should confirm the TSCA Inventory status of each CAM, modified CAM, or doped CAM. If there is uncertainty, a [bona fide intent](#) submission may be appropriate.
2. Companies preparing PMNs or SNUNs should evaluate EPA's standardized documents before submitting. Those documents identify the data and assumptions EPA is likely to use, including

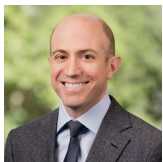
cobalt-based inhalation benchmarks, environmental hazard assumptions, fate assumptions, and expected risk-management terms.

3. Companies should assess whether their operations can meet the types of controls EPA is now identifying, including 99% dust capture/control, worker exposure monitoring, APF-based respiratory protection, no release to water, RCRA Subtitle C disposal, air-release limits, and battery labeling.
4. Companies involved in battery recycling, black mass production, reclamation, shredding, or other end-of-life activities should closely review the proposed SNUR's article-exemption and processing language. EPA's position that recycling and reclamation can trigger TSCA processing obligations may have significant implications for downstream companies that do not view themselves as traditional companies subject to TSCA.
5. Affected companies should consider submitting comments by July 10, 2026, particularly on the feasibility and clarity of EPA's proposed restrictions, the battery labeling requirement, the article-exemption language, the treatment of recycling and reclamation, and the types of data that should allow EPA to modify standardized restrictions.

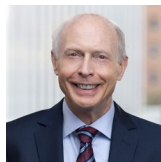
EPA's proposed SNUR and accompanying documents signal that TSCA compliance will remain a prominent issue for domestic battery supply chains. Companies developing or commercializing innovative CAM technologies, and those considering recycling of battery materials, should build TSCA review, inventory diligence, and risk-management planning into product development and commercialization timelines.

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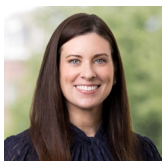
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