

化学科推薦入試 小論文〔問題〕用紙	受験番号	氏名
受験番号と氏名を全ての用紙に記入すること。 試験終了時に全ての用紙を回収します。		

北里大学理学部化学科 2024年度公募制推薦入試 小論文課題

[問題] “EPA advises on PFAS disposal technologies”という題目の次の英文を読んで、以下の問1～4に答えよ。

Three technologies offer the best potential for disposing of per- and polyfluoroalkyl substances (PFAS) while keeping these “forever chemicals” out of the environment, the US Environmental Protection Agency says.

PFAS are synthetic compounds that resist heat, harsh chemical conditions, or moisture, and they have broad applications in industry and society. Those same properties mean that the substances don’t readily degrade in the environment, which creates a challenge for their disposal.

Burning PFAS as hazardous waste is one of the three technologies the EPA suggests in interim guidance issued in December. Commercial incinerators, cement kilns, and lightweight aggregate kilns “can potentially achieve temperatures and residence times sufficient to break apart the PFAS contained in the waste stream being thermally treated,” the guidance says.

But this technology has a big unknown: what’s emitted into the air when these facilities burn PFAS. The EPA says it is gathering information to determine if these facilities can adequately control potential products of incomplete combustion.

A second disposal technology the agency selected is placing PFAS waste into landfills. Hazardous waste landfills that have extensive pollution controls are more effective than municipal waste landfills at keeping PFAS waste out of the environment, the guidance says.

Disposal in landfills also has significant unknowns, according to the EPA. These include how PFAS waste might interact with and affect the integrity of landfill liners and whether these chemicals might escape from landfills into the atmosphere.

The third technology is disposing of liquid PFAS into deep injection wells. A limited number of these disposal wells accept PFAS waste, however, and the cost of transporting liquid waste to them could render this option impractical, the EPA says.

Noting the lack of data on the outcomes of these disposal methods, Olga Naidenko, a vice president at the advocacy nonprofit Environmental Working Group, faults the EPA for failing to “stop the environmental injustice of PFAS contamination in communities near the disposal sites.”

The EPA guidance applies to materials with PFAS that are not consumer products. This marks the first guidance the EPA has provided on the disposal of any PFAS.

(出典) C. Hogue, *C&EN*, 2021, 99(1), p. 16 | January 4, 2021.

[注] EPA (the US Environmental Protection Agency) 米国環境保護庁；PFAS 有機フッ素化合物のうち、ペルフルオロアルキル化合物およびポリフルオロアルキル化合物の総称；harsh 苛酷な；degrade 分解する；interim 暫定的な；incinerator 焼却炉；kiln 炉；combustion 燃焼；landfill 廃棄物処分場；municipal 地方自治体の；injection 投入；Olga Naidenko (人名；訳す場合はそのままよい)；the advocacy nonprofit 環境保護非営利団体；fault 非難する；injustice 不正；contamination 汚染

問1 PFAS とはどのような性質の化合物か。本文に即して日本語で説明しなさい。

問2 EPA が提案する PFAS の3つの処分方法を日本語で述べなさい。

問3 下線部を日本語に訳しなさい。

問4 今日 PFAS のように、様々な人工物質が環境を汚染することが知られています。人類にとって有用な化合物の開発と自然環境保全の調和について、あなたの考えを300字程度で述べなさい。