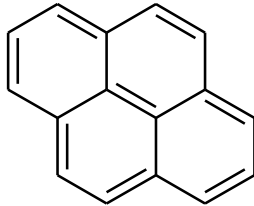


19	CAS No.: 129-00-0	Substance: Pyrene
<p>Chemical Substances Control Law Reference No.: 4-782  PRTR Law Cabinet Order No.:</p> <p style="text-align: center;">Structural Formula:</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div data-bbox="145 338 454 414" style="width: 30%;"> <p>Molecular Formula: C<sub>16</sub>H<sub>10</sub>  Molecular Weight: 202.25</p> </div> <div data-bbox="683 338 938 542" style="width: 30%; text-align: center;">  </div> </div>		

### 1. General information

The aqueous solubility of this substance is 0.135 mg/L (25°C), the partition coefficient (1-octanol/water) (log K<sub>ow</sub>) is 4.88, and the vapor pressure is 2.45×10<sup>-6</sup> mmHg (=3.27×10<sup>-4</sup> Pa) (25°C, extrapolated value). The mean biodegradability (aerobic degradation) as determined by BOD, TOC, and GC is 71% (test substance concentration of 5 mg/L) and 11% (test substance concentration of 10 mg/L). The substance does not have any hydrolyzable groups.

This substance is contained in coal tar, and the main applications of coal tar are as a raw material for tar products, rustproof coating, fishing net dyestuff, lamp black, fuel, road paving, roof coating, cast iron pipe coating, waterproof coating, and as an electrode binder. Polycyclic aromatic hydrocarbons (PAHs) containing this substance are unintentionally formed and released to the environment. Release sources of PAHs to the environment are classed as either combustion-derived or non-combustion-derived, and combustion-derived sources are believed to account for more than 90%.

### 2. Exposure assessment

Because this substance is not a Class 1 Designated Chemical Substance under the Law Concerning Reporting, etc. of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management (PRTR Law), release and transfer quantities could not be obtained. Predictions of distribution by medium using a Mackay-type level III fugacity model indicated that if equal quantities were released to the atmosphere, water bodies, and soil, the proportions distributed to soil would be higher.

The predicted maximum exposure to humans via inhalation, based on general environmental atmospheric data, was approximately 0.006 µg/m<sup>3</sup>. The predicted maximum oral exposure was estimated to be less than around 0.00024 µg/kg/day based on calculations from data for groundwater. Further, there is a report of around 0.04 µg/kg/day calculated from food data, albeit from a limited area. In addition, while detailed survey results are not clear, a daily intake quantity of 0.03 µg/kg/day has been reported based on the findings of a survey that measured quantities contained in samples of various groups of food purchased in seven cities throughout Japan.

The predicted environmental concentration (PEC), which indicates exposure to aquatic organisms, is less than around 0.006 µg/L for public freshwater bodies and about 0.010 µg/L for seawater.

### 3. Initial assessment of health risk

Exposure to sunlight may induce the irritant action of this substance on the skin, causing chronic skin discoloration. Redness of the skin or eyes is caused by contact with this substance. Acute oral and inhalation exposure studies in rats have reported persistent self-stimulation, delirium, myotonia or spasticity.

Sufficient information could not be obtained on its carcinogenicity, and its initial assessment was conducted on the basis of data on its non-carcinogenic effects.

As for its oral exposure, its no-observed-adverse-effect-level (NOAEL) of 75 mg/kg/day (for increase in liver and

kidney weights, nephropathy in females) obtained from its mid-term and long-term toxicity tests for rats was divided by 10, due to their short test periods, to produce 10 mg/kg/day as its ‘non-toxic level\*’. As for inhalation exposure, its ‘non-toxic level\*’ could not be identified.

As for its oral exposure, the predicted maximum exposure was estimated to be around 0.00024 µg/kg/day, when intakes of groundwater were assumed. Its margin of exposure (MOE) would be more than 3,100,000 when calculated from its ‘non-toxic level\*’ of 7.5 mg/kg/day and the predicted maximum exposure, and then divided by 10 due to the fact that ‘non-toxic level\*’ was obtained from animal experiments. When its exposure through food intakes, as reported for some location, are considered, the predicted maximum exposure will be around 0.04 µg/kg/day to provide MOE of 19,000. No further action will be required at the moment to assess health risk from oral exposure to this substance.

As for inhalation exposure to this substance, its ‘non-toxic level’ could not be identified, and its health risk could not be assessed. The ‘non-toxic level’ for its oral exposure, if 100% absorption is assumed for it, turns to be the ‘non-toxic level’ of 25 mg/m<sup>3</sup> for its inhalation exposure. When combined with the predicted maximum concentration in the ambient air, MOE will be calculated to be 420,000. Collection of information on its inhalation exposure to assess health risk associated with exposure to it in the ambient air would not be required.

Information of toxicity				Exposure assessment		Result of risk assessment			Judgment
Exposure Path	Criteria for risk assessment	Animal	Criteria for diagnoses (endpoint)	Exposure medium	Predicted maximum exposure quantity and concentration	MOE			
Oral	‘Non-toxic level*’, 7.5 mg/kg/day	Mice	Increase in liver and kidney weights and nephropathy in females	Drinking water	— µg/kg/day	MOE	—	×	○
				groundwater	< 0.00024 µg/kg/day	MOE	> 3,100,000	○	
Inhalation	‘Non-toxic level*’, — mg/m <sup>3</sup>	—	—	Ambient air	0.006 µg/m <sup>3</sup>	MOE	—	×	(○)
				Indoor air	— µg/m <sup>3</sup>	MOE	—	×	×

Non-toxic level \*

- When a LOAEL is available, it is divided by 10 to obtain a level equivalent to NOAEL.
- When an adverse effect level is available for the short-term exposure, it is divided by 10 to obtain a level equivalent to an adverse effect level for the long-term exposure.

#### 4. Initial assessment of ecological risk

With regard to acute toxicity, the following reliable data were obtained: a 48-h median effective concentration (EC<sub>50</sub>) of 4.33 µg/L for swimming inhibition in the crustacean *Daphnia magna*, and a 96-h median lethal concentration (LC<sub>50</sub>) of 30 µg/L in the fish species *Pagrus major* (red sea bream). No value for algae was obtained that could be used, but the acute toxicity to *Pseudokirchneriella subcapitata* was considered to exceed the degree of solubility. Accordingly, an assessment factor of 100 was applied and a predicted no effect concentration (PNEC) of 0.04 µg/L was obtained based on the acute toxicity values.

With regard to chronic toxicity, the following reliable data were obtained: a 21-d no observed effect concentration (NOEC) of 20 µg/L for reproductive inhibition in the crustacean *D. magna*; and a 39-d NOEC of 5 µg/L was obtained for developmental inhibition in the fish species *Oryzias latipes* (medaka). No value for algae was obtained that could be used, but the chronic toxicity to *P. subcapitata* was considered to be approximately the degree of solubility. Accordingly, an assessment factor of 10 was applied and a predicted no effect concentration (PNEC) of 0.5 µg/L was obtained based on the chronic toxicity values. The 0.04 µg/L obtained from the acute toxicity to the crustacean was used as the PNEC for this substance.

The PEC/PNEC ratio was less than 0.2 for freshwater bodies and was 0.3 for seawater. Accordingly, further efforts

to collect data are considered necessary. Further, 0.0099 µg/L was detected in public freshwater bodies in fiscal 1999, and the ratio between this and PNEC is 0.2.

Hazard assessment (basis for PNEC)			Assessment factor	Predicted no effect concentration PNEC (µg/L)	Exposure assessment		PEC/PNEC ratio	Result of assessment
Species	Acute/chronic	Endpoint			Water body	Predicted environmental concentration PEC (µg/L)		
Crustacean (water flea)	Acute	EC <sub>50</sub> Swimming inhibition	100	0.04	Freshwater	<0.006	<0.2	▲
					Seawater	0.010	0.3	

## 5. Conclusions

	Conclusions		Judgment
Health risk	Oral exposure	No need for further work.	○
	Inhalation exposure	Though a risk characterization cannot be determined, there would be little necessity of collecting information.	(○)
Ecological risk	Requiring information collection.		▲

[Risk judgments] ○: No need for further work      ▲: Requiring information collection  
 ■: Candidates for further work      ×: Impossibility of risk characterization  
 (○) : Though a risk characterization cannot be determined, there would be little necessity of collecting information.  
 (▲) : Further information collection would be required for risk characterization.