**Technetium (Tc)**

**Element classification:** Transition metal

**No. of isotopes:** 35 (none are stable); numerous ‘meta’ states

**Typical elemental concentrations:** None (element synthetically produced)

---

**Radioisotopes of significance to environmental radioactivity**

- $^{99}_{\text{Tc}}$
- $^{99m}_{\text{Tc}}$

---

**For more information ...**

- IRSN $^{99}_{\text{Tc}}$ factsheet

---

**Key sources of radioisotopes**

- **Nuclear cycle:** Generated by nuclear fission of $^{235}_{\text{U}}$; present in radioactive waste (discharged to marine environment via nuclear reprocessing plants)
- **Fallout:** None
- **Nuclear accidents:** Chernobyl
- **Natural sources:** None

---

**Why is it of interest?**

- A key radionuclide with respect to geological repositories of nuclear waste
- Some long lived isotopes (e.g. $^{99}_{\text{Tc}}$) have high transfer to seaweeds and lobsters
- $^{99m}_{\text{Tc}}$ is used in nuclear medicine
- Poor knowledge of behaviour in terrestrial ecosystems

---

**Behaviour in the Environment**

- Chemical behavior of Tc is dependent upon the oxidation state of the Tc species and its redox potential
- Tc (+VII) predominates in the environment under aerobic conditions (i.e. where oxygen is present) and is relatively ‘mobile’
- Tc (+IV) predominates in reduced conditions (i.e. where no oxygen is present) and is less ‘mobile’ in the environment
- Studies of $^{99}_{\text{Tc}}$ in the environment have concentrated on marine ecosystems

---

**Technetium**

radioecology

---

**For more information ...**

- IRSN $^{99}_{\text{Tc}}$ factsheet

---

**Why is it of interest?**

- A key radionuclide with respect to geological repositories of nuclear waste
- Some long lived isotopes (e.g. $^{99}_{\text{Tc}}$) have high transfer to seaweeds and lobsters
- $^{99m}_{\text{Tc}}$ is used in nuclear medicine
- Poor knowledge of behaviour in terrestrial ecosystems

---

www.radioecology-exchange.org