Efficient Solutions for Waste Water Treatment Using Electron Beams

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Over the last 100 years, we have benefitted from new chemical and pharmaceutical products intended for “Better Living for Humankind”. It is estimated that about 80,000 different chemicals were released into the environment over during the recent decades.
Many of these chemicals find their way to surface and ground water, typically through use of treated domestic/industrial water, overflows from sewers/septic tanks, metabolism of animals. 
Till to date, 26 million organic and inorganic substances have been inventoried.
Typical Wastewater Treatment

Main purpose of wastewater treatment

- Removal of harmful impurities (COD, BOD, S/S etc.)
- Removal of color, odor etc.
- Removal of T-N, T-P
Pollutants in wastewater:

Pathogens
Oxygen depleting organics
Nutrients (N,P)
Heavy Metals
Chemicals – POPs

Endocrine disruptors
Pesticide
Pharmaceutical residues
Plasticizer etc.
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Electron Beam Technology

- Disinfection of microorganisms (Pathogenic organisms etc.) to discharge to river, or to re-use in industries or irrigation
- Destruction of residual chemicals, such as POPs, endocrine disrupters, Pesticides, and Pharmaceutical residues.
Wastewater Treatment with E Beams

Harmful Organic in Wastewater

- Complete Decomposition
- Partial Decomposition
- Suspended Solid
- Monomer to Polymerization
- Removal of Toxic Group
- Removal of Color, Odor

Coagulation

Bio-Treatment

H₂O, CO₂

Water Molecule → Active Radicals

eₐq

OH* → H* → H₂O₂
The mobile electron beam accelerator system developed can treat up to 500 m³ liquid waste/day or 10,000 m³/h of effluent gases and can be used at the site as a Pilot scale facility.
Full-scale electron beam accelerator (1 MeV, 400 kW) plant for treatment of 10,000 m³/d of waste water from textile dye industry
Summary

It is becoming increasingly clear that humankind’s environmental problems are no longer merely local or regional, but have become continental in scope. Economically and technically feasible technologies for controlling pollution are being sought by technologists, and electron beam technology is a promising option.

Electron beam technology is eco-friendly process with no addition of chemical compounds, no heating and ease of automation. Therefore, it is an effective method of remediation of environmental pollutions, such as for industrial and wastewater treatment, and also for the sludge treatment and reuse.
Thank you!

Cleaner living through electrons