Continuous Electrocoagulation Treatment of Wastewater from Copper Production

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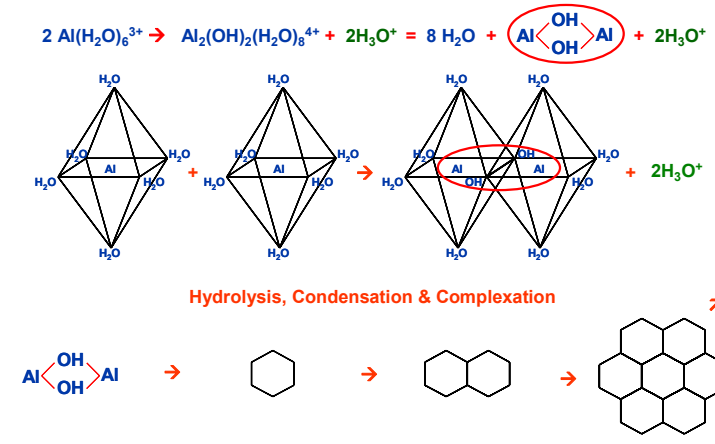
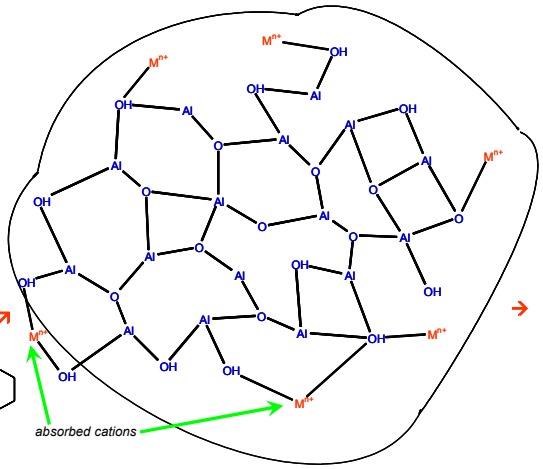
Proposed Electrocoagulation Mechanism & Functional Principle





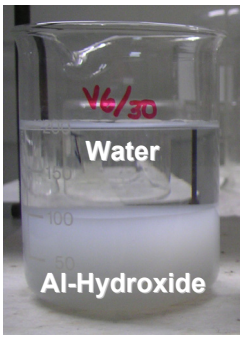


Fig. 3: Al-Hydroxide in Electrocoagulation

$Al_2(OH)_2(H_2O)_8^{4+} \rightarrow Al_6(OH)_{12}(H_2O)_{12}^{6+} \rightarrow Al_{10}(OH)_{22}(H_2O)_{16}^{8+} \rightarrow Al_{24}(OH)_{60}(H_2O)_{24}^{12+}$

Fig. 1: Proposed Electrocoagulation mechanism in aluminium-based systems

Fig. 2: Absorption of dissolved cations in metal containing effluents

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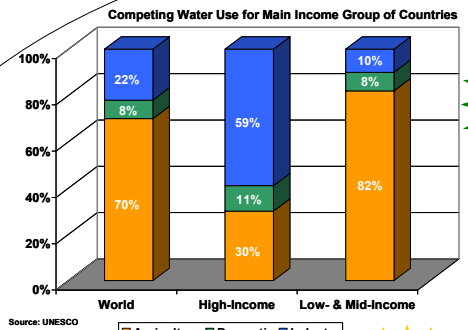
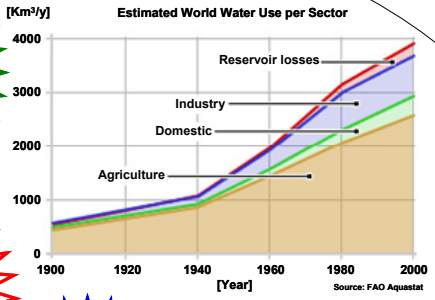
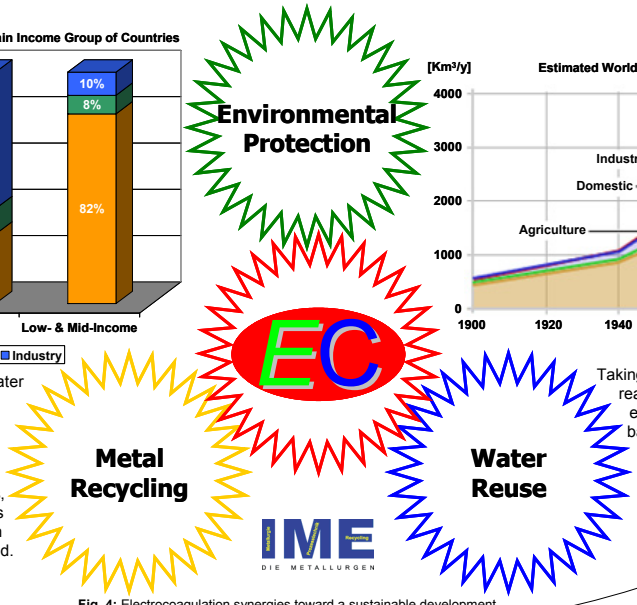
Institute for Physical Chemistry **IPC**

Wastewater was supplied by **RTB-BOR**, a Serbian mining and smelting complex, whose metal containing effluents are being currently discharged at the river basin Saraka.

World Water Crisis







According to World Water Council, nearly 70% of water resources is required for agriculture worldwide.

Industrial use of water increases with country income, going from 10% for low- and middle-income to 59% for high-income countries.

If water consumption trend continues, by 2020 17% more water than is available will be required in order to feed the world.

Taking these figures into account it is possible to realize the importance of water reuse for the economy of developing countries, mostly based on agriculture, as well as for the industry at developed countries.

After all, it would be irrational not to care for food in a shared ecosystem.

Fig. 4: Electrocoagulation synergies toward a sustainable development

Project within the

Sixth Framework Programme

RTUA-Tuzla-TMF Serbia-CIB-RTB BOR-TMF Skopje-BU-RWTH Aachen
INTREAT
Integrated treatment of industrial wastes towards prevention of regional water resources contamination

Chemical Precipitation

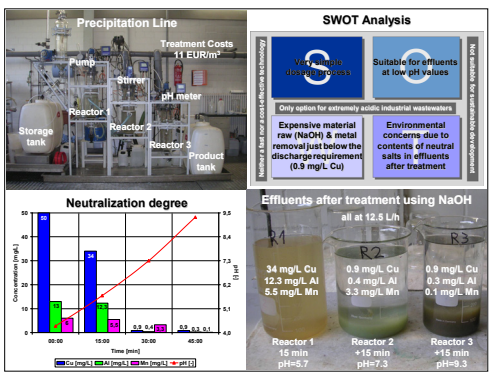


Fig. 5: Summary of operational facts concerning chemical precipitation

vs.

With less than one-tenth of treatment costs compared to NaOH precipitation using the very same wastewater, EC provided enough evidence of being cost-effective and environment-friendly.

After EC-treatment, effluents seem to be not only more suitable for industrial water reuse, but also the sludge has marketable properties since it is mostly Alumina Al_2O_3, lowering disposal costs.

Electrocoagulation

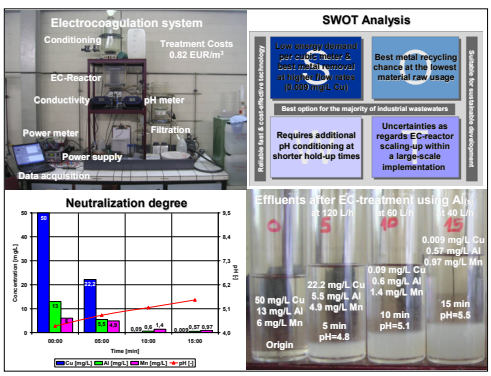


Fig. 6: Summary of operational facts concerning Electrocoagulation

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