

Treatment of Municipal and Paint Industrial Wastewater by Electrochemical processes

2nd Saudi International Water Technology Conference

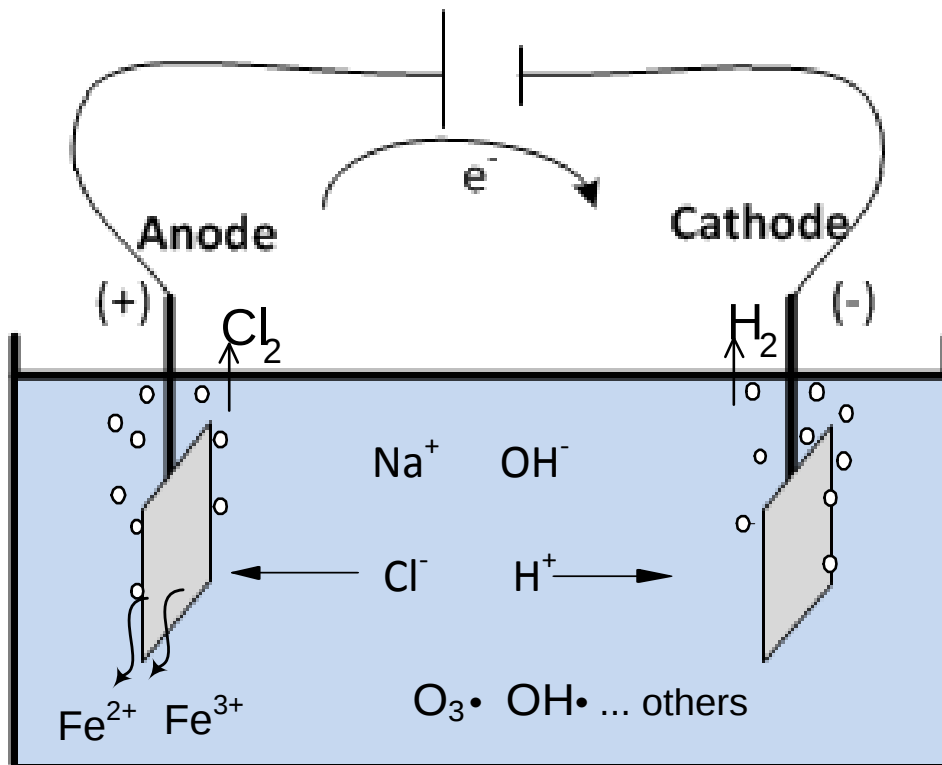
King Abdulaziz City for Science & Technology (KACST) – Riyadh
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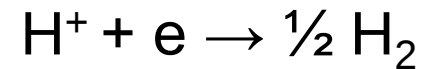
Background

- **Wastewater Treatment Technologies**
 - Biological: Activated Sludge, RBC, SBR, TF, etc.
 - Chemical: Precipitation, oxidation, disinfection, AOP, etc...
 - Physical: Air Flotation, Filtration, Membranes, etc...
- **Electrochemical Processes**
 - Electro-oxidation
 - Electro-coagulation
- **Aim of Research on Electrochemical Processes**
 - To show that Electrochemical processes can provide an additional option for wastewater treatment

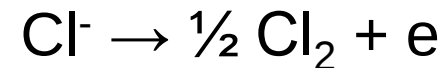
Principles of the Electrochemical Process



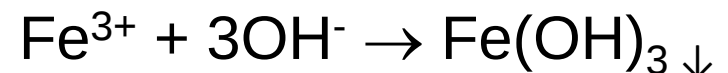
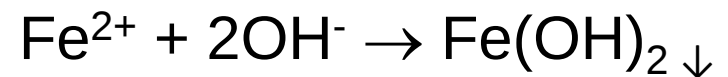
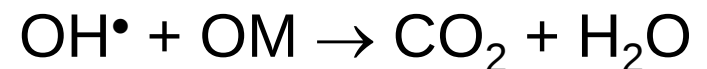
- Cathode reaction (reduction)



- Anode reaction (oxidation)



- Other reactions



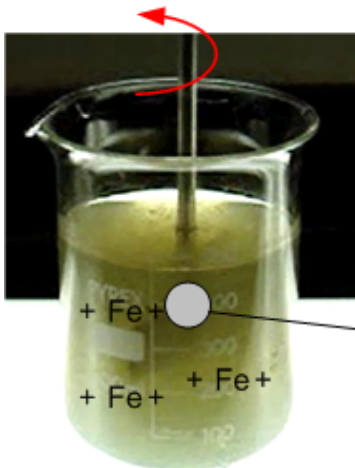
Principles of Coagulation



Particles do not settle



Particles become destabilized



Particles Agglomerate and form a floc

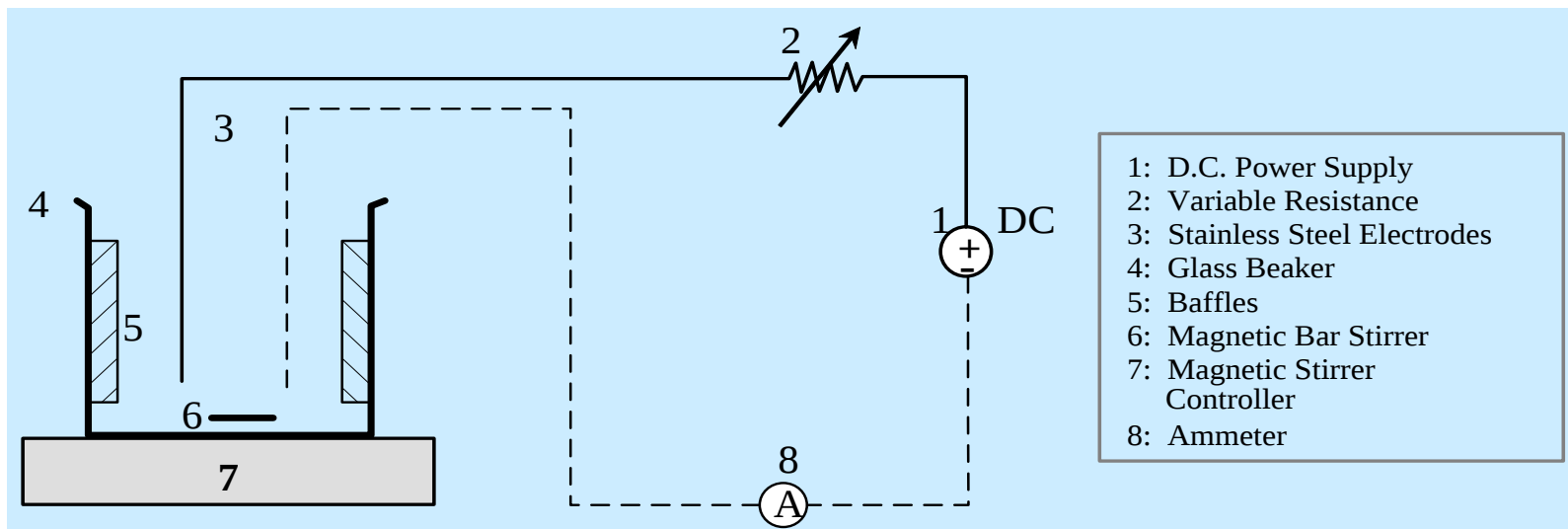


Settled Particles

Case Studies for Treating WW

Wastewater Characteristics

Influent Parameters	Municipal	Paint
BOD, mg/l	84 - 112	-
COD, mg/l	-	19,000
TSS, mg/l	126 - 160	6,500



Schematic Diagram of Experimental Setup

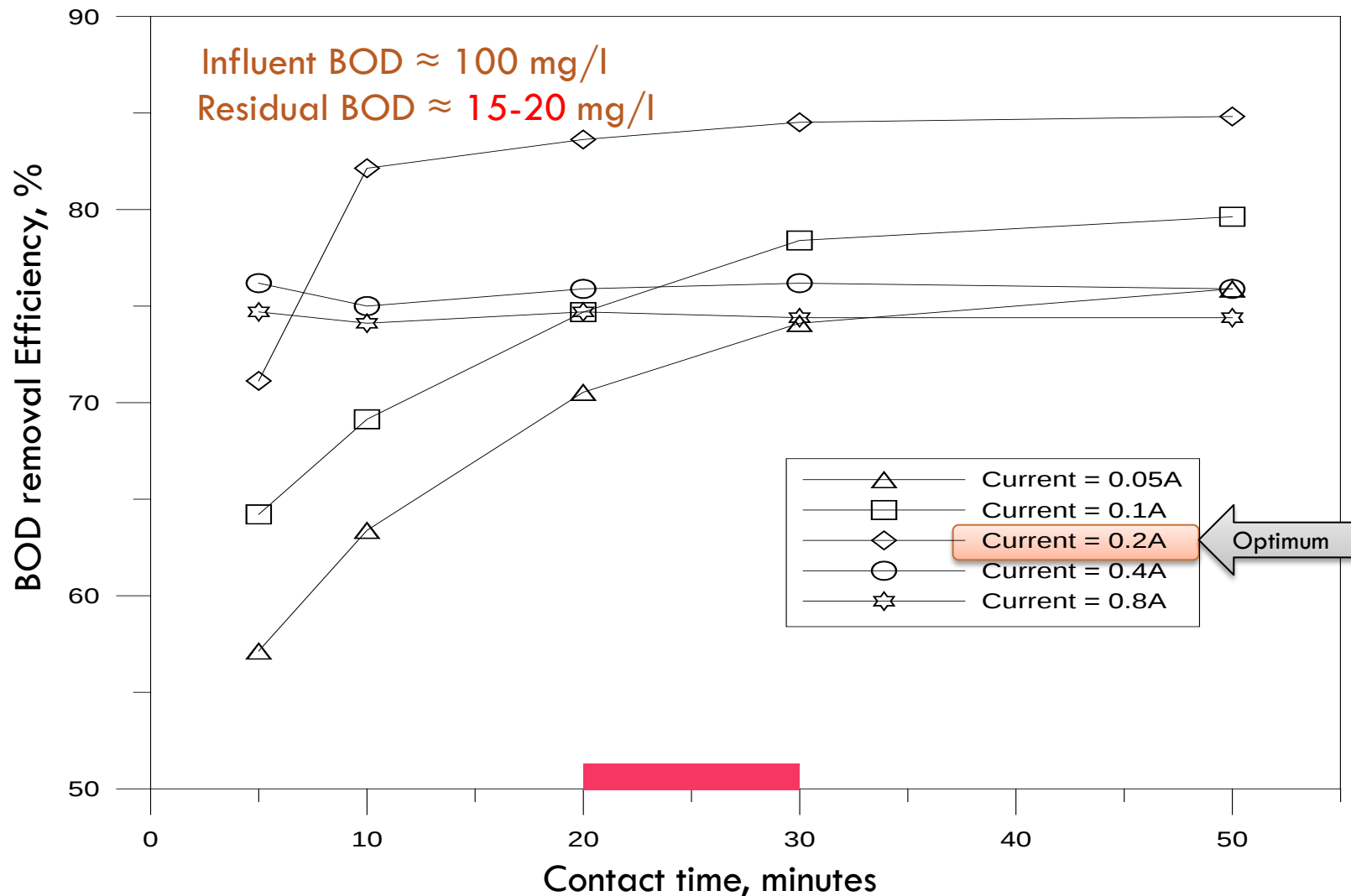


Experimental Results

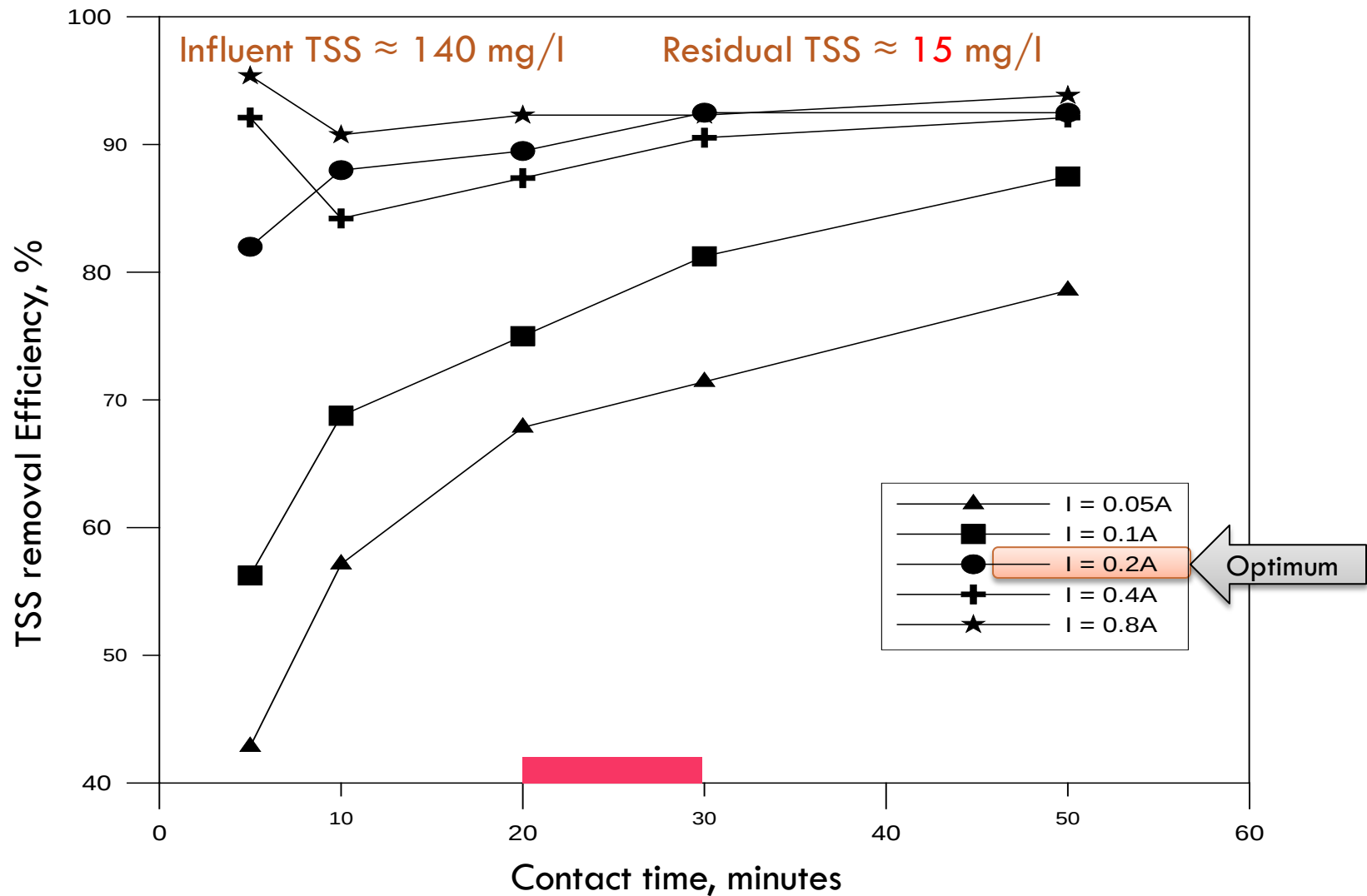
Municipal Wastewater Case Study



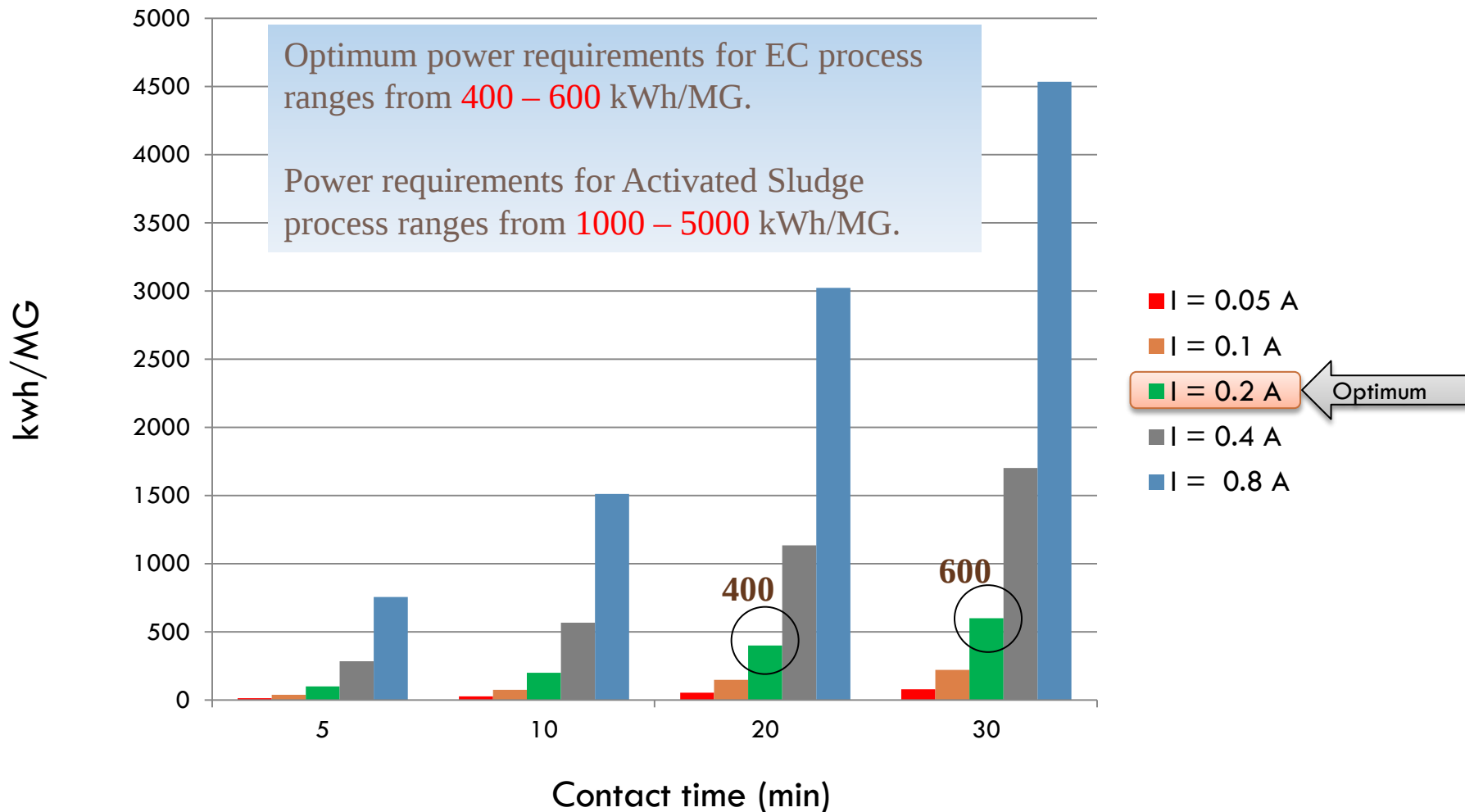
BOD Removal Efficiency



TSS Removal Efficiency



Power Requirement for the EC Process

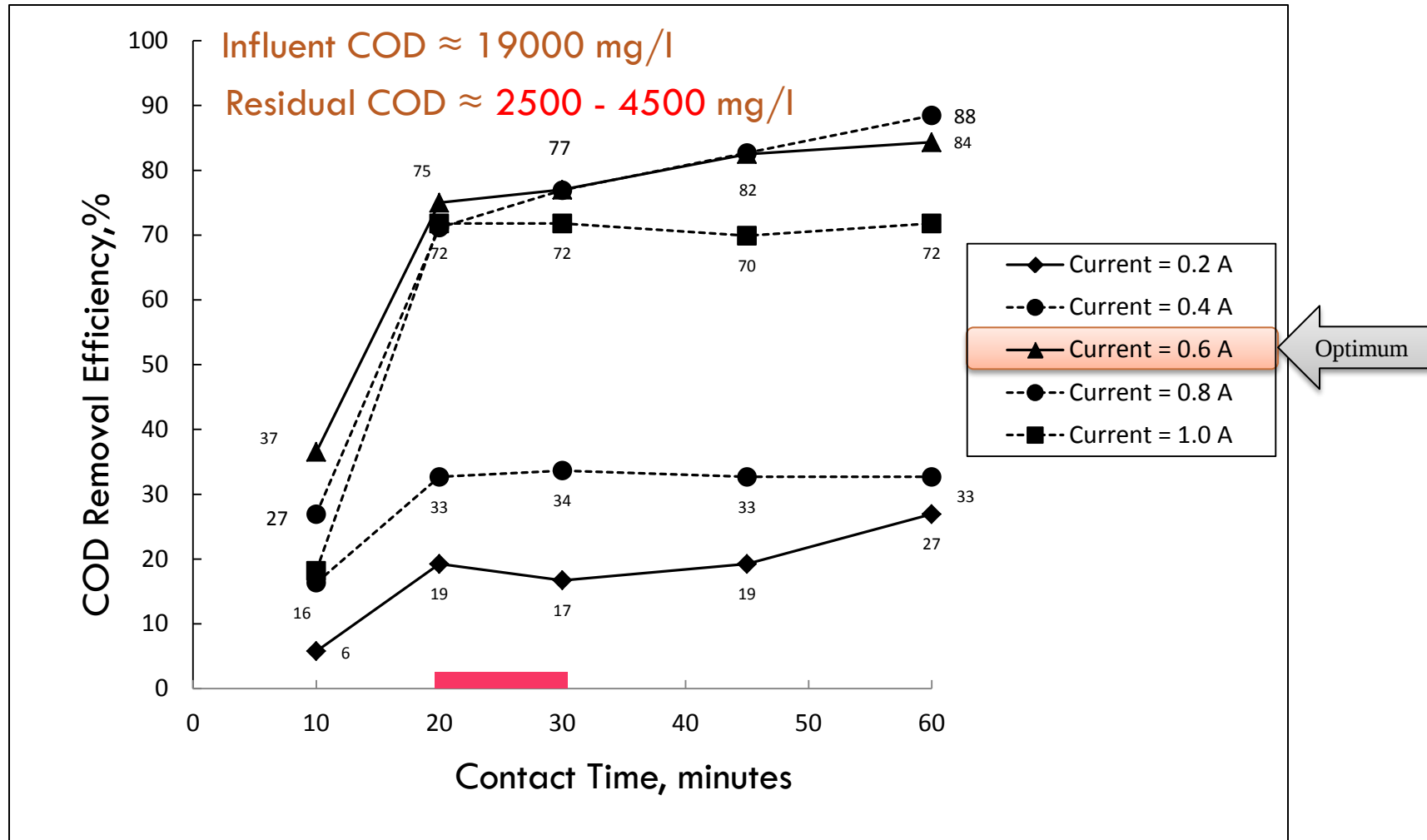


Experimental Results

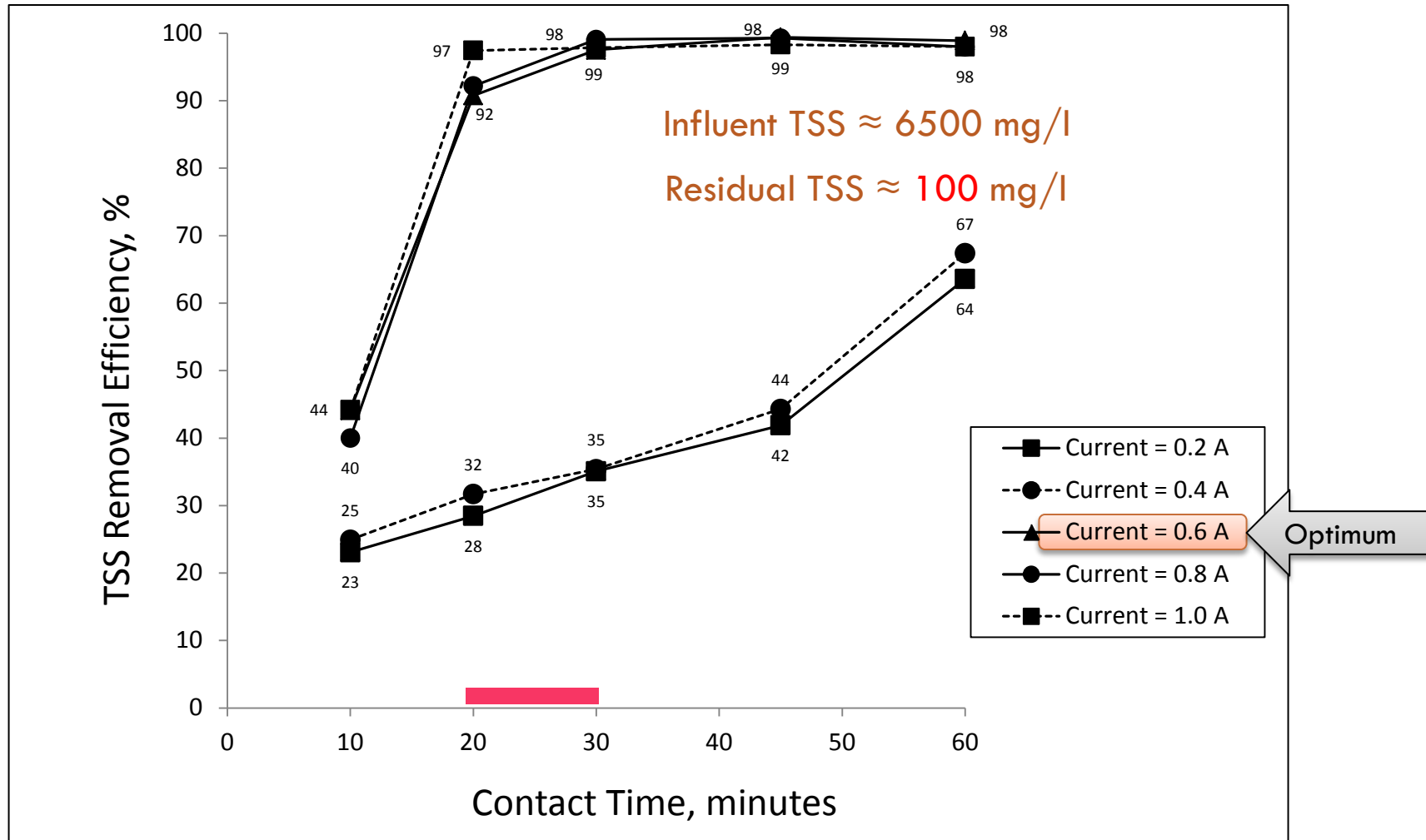
Paint Wastewater Case Study



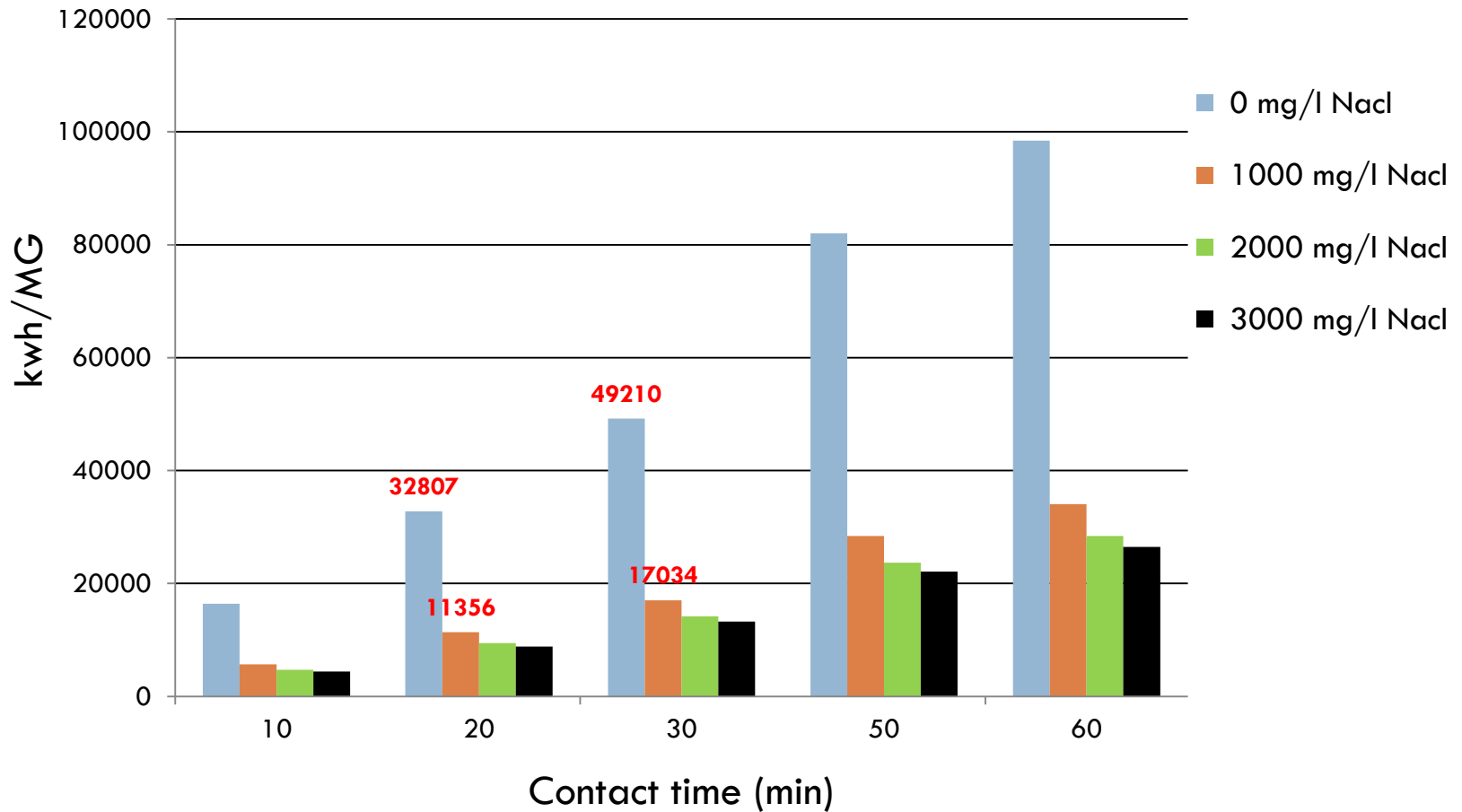
COD Removal Efficiency



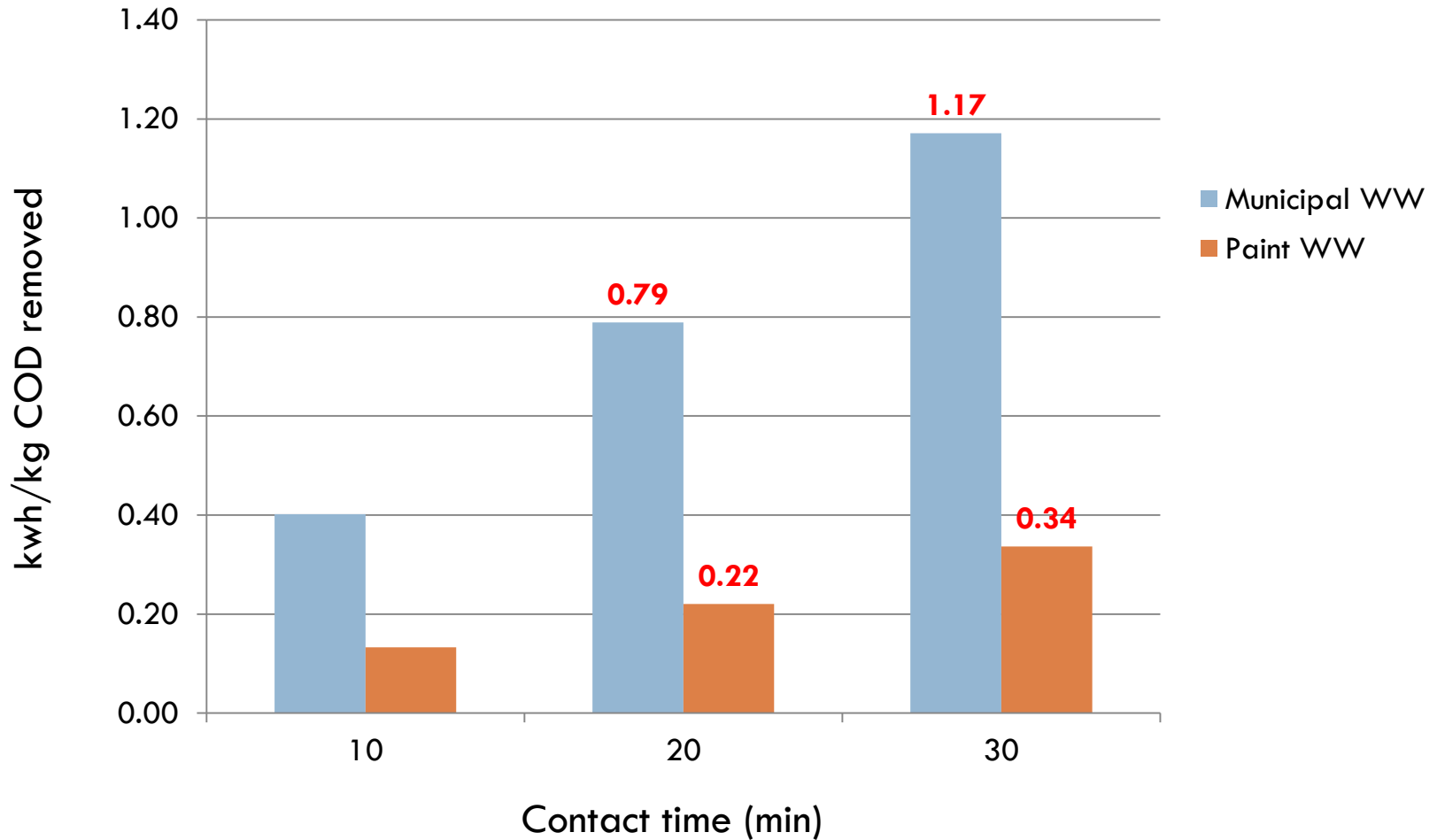
TSS Removal Efficiency



Power Requirement



Power Requirement; **Municipal vs Paint**



Concluding Remarks

- EC is a promising technology for WW treatment
 - High removal efficiency of COD, TSS, Turbidity, etc.
 - Simple operation and small footprint
 - Economically competitive
- Can provide an additional option for WW treatment
 - Electro-oxidation
 - Electro-coagulation
- Has the potential to be integrated with current conventional treatment systems

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Thank You

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