

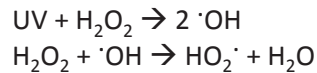
Removing Methanol Additives from Fracking Fluids

Lisandr  Meyer and Dr. Daniel Meeroff
College of Engineering and Computer Science
Florida Atlantic University

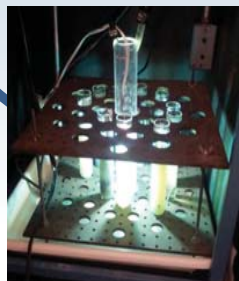
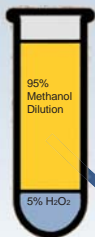
Introduction

- The objective is to test the removal efficiency of methanol additives from fracking fluids using advanced oxidation technology with hydrogen peroxide and ultraviolet energy (H₂O₂/UV)
- Methanol additives used in fracking fluids can contaminate nearby groundwater and pollute the air. It is estimated that 32.5 tons of methanol per year is released into the environment (EPA 2011).
- Evaporation methods have been used to remove the methanol; however, it has been discovered that using evaporation methods is more expensive than using advance oxidation method (Meeroff and Teegavarapu 2010).

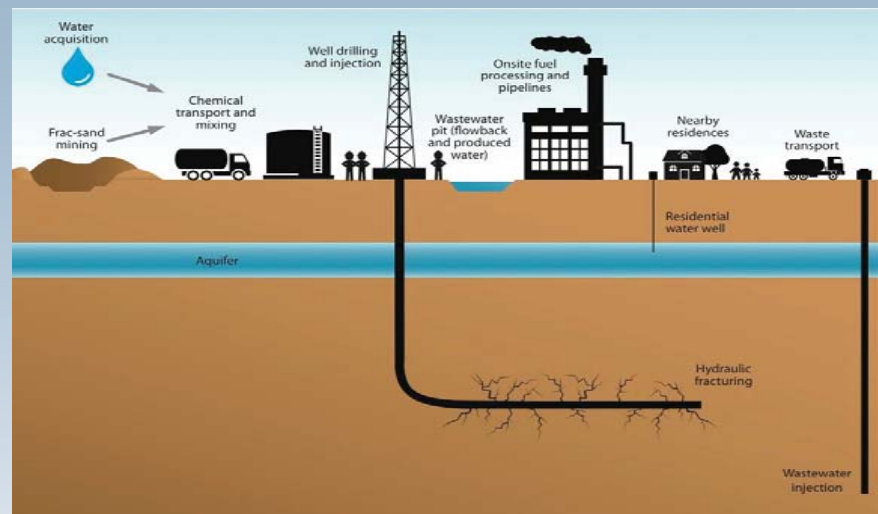
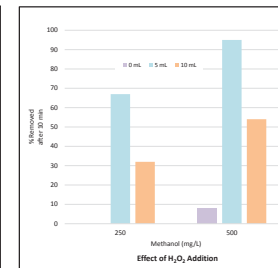
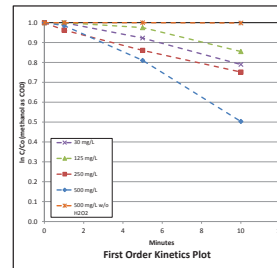
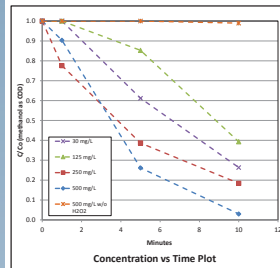
Method



- Samples Prepared {0,30,125,250,500} ppm CH₃OH
- UV/H₂O₂ treatment {0, 1, 5, 10} minutes
- Test for COD removal



Results



Conclusion

- The reaction is concentration dependent, meaning the stronger the concentration of the methanol the more efficient the reaction
- The reaction is fast, after 20 minutes there was 99% removal
- Reaction appears to be pseudo first order when the hydrogen peroxide was held constant

Next Steps

- Optimize the hydrogen peroxide concentration
- Shorten the reaction time by increasing the UV power
- Evaluate the process using field samples of fracking fluids

References

- US EPA (2011). "Industry Study Downplays Water Risks From Methanol Use in Fracking Fluid." Inside EPA's Environmental Policy Alert 28.19.
- Meeroff, D. E. & Teegavarapu, R. (2010). Interactive decision support tool for leachate management. Gainesville, FL: Hinkley Center for Solid and Hazardous Waste Management.
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Acknowledgements

- I would like to thank the following for sponsoring this project
- Hinkley Center for Solid and Hazardous Waste Management
 - Advanced Technology Group
 - FAU OURI



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