Fenton Oxidation – Fundamentals, Optimization and Applications

Investigator:

Scott G. Huling, P. Kyle Jones EPA-GWERD

Collaborators:

Eunsung (Bryan) Kan
NRC Post Doctoral Fellow
P.O. Box 1198
Ada, OK 74820
580-436-8604
kan.eunsung@epa.gov

David Sabatini
Civil and Environmental Engineering
The University of Oklahoma
202 W. Boyd St., Room 334
Norman, OK 73019-1024

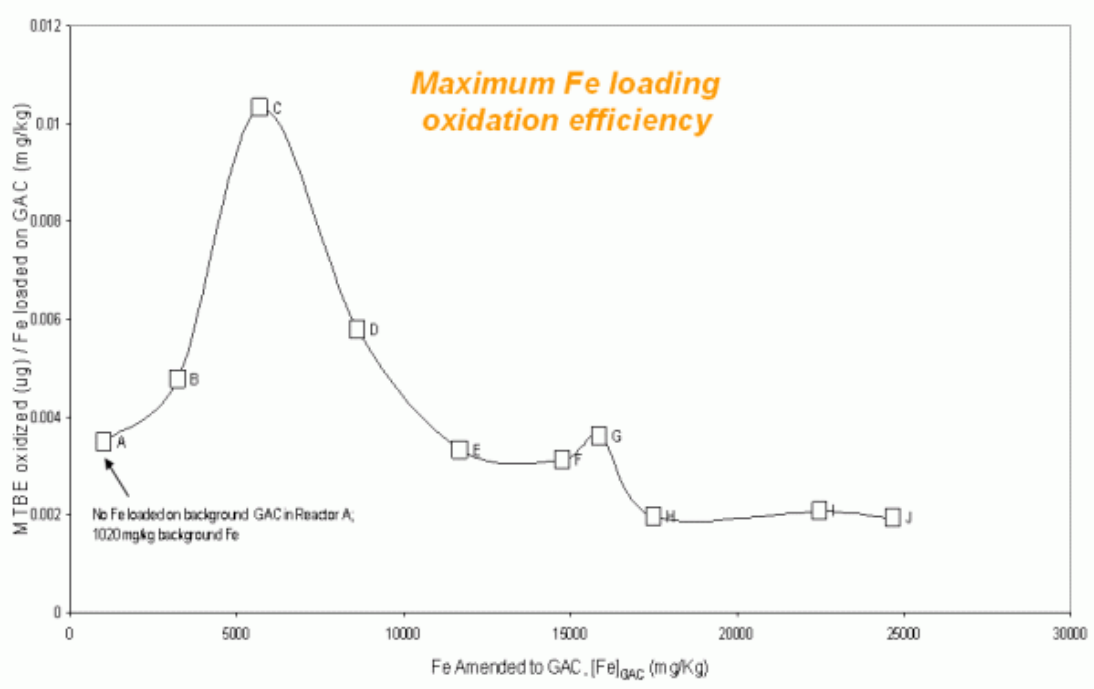
Project Overview/Results:

Column studies at EPA GWERD involving Fenton-driven regeneration of MTBE-spent GAC

Fenton oxidation research is underway to identify and manipulate environmental conditions to minimize undesirable reactions contributing to process inefficiency, and to facilitate favorable transformation reactions. This information is critically needed to improve the regeneration of activated carbon by Fenton oxidation. Specifically, this project includes several investigations pertaining to fundamental mechanisms involved in the Fenton regeneration of activated carbon which will be used to optimize Fenton

regeneration of activated carbon. This information will be used for treatment process optimization including pH, Fe, H_2O_2, hydraulic loading, GAC type, acidic and basic functional groups, use of reductants, and the role of O_2(g). Pilot-scale application of the optimized treatment process at a hazardous waste field-site is planned.

Iron is a critical element in the Fenton reaction and must be present in sufficient quantity for effective and efficient contaminant oxidation and GAC regeneration (Huling and Jones, 2005). It is anticipated that amendment of Fe to GAC will be required in nearly all cases to facilitate the Fenton reaction and to achieve the carbon regeneration treatment objectives. The objectives of this study are to determine the Fe concentration on GAC which results in the maximum degradation of the target contaminant.



Optimal Fe loading for Fenton-driven regeneration of MTBE-spent GAC

Reference:

Huling, S.G. and K.P Jones. (In Review 2006). "Iron Optimization in Fenton-Driven Chemical Regeneration of Granular Activated Carbon."