

Abstract Submitted  
for the DPP12 Meeting of  
The American Physical Society

**Impurity behavior in high performance FRC plasmas in the C-2 device** DEEPAK GUPTA, J. DOUGLASS, H. GOTA, A. QERUSHI, M. TUSZEWSKI, A. VANDRIE, Tri Alpha Energy, Inc., Rancho Santa Margarita, CA 92688, TAE TEAM — In the C-2 FRC plasma, low impurities densities are essential to keep the radiation losses low as well as to achieve stable high performance FRC (HPF) plasma operation. In C-2, Titanium gettering, primarily used to reduce the wall recycling and neutrals, helps to significantly reduce impurities, namely carbon and oxygen. Therefore, these impurities provide a measure of wall conditioning, which is essential for HPF plasma operation. Time-dependent radiation measurements and modeling are needed for C-2 plasma, particularly to account for high-Z impurities including Titanium. Long-lived HPF plasmas with high confinement times also demand an exploration of poorly understood impurity transport in FRCs. Multiple diagnostics, related to impurities measurements, are available on C-2 (e.g., Survey spectrometers, Bolometer arrays, Bremsstrahlung arrays, various line emission monitors, fast-cameras with filters and Residual Gas Analyzers). Preliminary experimental results, based on Bolometer and Bremsstrahlung diagnostics, suggest an increase of impurity density with time during HPF plasma discharges. Experiments are also done with different gas species and impurity injections. Studies and developments are underway to further understand the role and behavior of impurities in C-2 FRC plasmas.

Deepak Gupta  
Tri Alpha Energy, Inc., Rancho Santa Margarita, CA 92688

Date submitted: 20 Jul 2012

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