# FLOW INDUCED POWER GENERATION FROM GRAPHENE

by

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# ABSTRACT

Water flow over carbon nanotubes has been shown to generate an induced voltage in the flow direction due to coupling of ions present in water with free charge carriers in the nanotubes. However the induced voltages are typically of the order of a few mV, too small for significant power generation. Here we perform tests involving water flow with various molarities of hydrochloric acid (HCl) over few-layered graphene and report order of magnitude higher induced voltages for graphene as compared to nanotubes. The power generated by the flow of 0.6 M HCl solution at about 0.01 m/sec was measured to be approximately 85 nW for about 30 μm × 16 μm size graphene film, which is equivalent to a power per unit area of about 175 $W/m^2$. Molecular dynamics simulations indicate that the power generation is primarily caused by a net drift velocity of adsorbed $Cl^-$ ions on the continuous graphene film surface.