Harnessing conventional fuel production using solar-actuated pyrolysis reactor for waste plastics in developing countries

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It is estimated that only about 10% of the 9 billion tonnes of plastics being produced is being recycled. Its abandonment after use in the environment has enormously contributed to flooding, loss of aquatic lives and gives an unsatisfying look to the environment. In a means to sanitize the environment, polymer wastes undergo a series of recycling processes of which pyrolysis, which is the thermal conversion of plastics into conventional fuel without the presence of oxygen is being done. Although this very recommending, it requires a lot of energy to achieve which hinders developing countries from actively participating due to their low power generating capacity. Hence, this paper looks at the possibility of performing the pyrolysis reaction of waste plastics in developing countries using the solar energy. The actuation was achieved by a concentrated radiation from the sun and backed up with flue Pyrolysis Gas when required. A process flow configuration which involves the reactor, solar lenses, vacuum pump, solar panel, inline components and the condenser is set up to perform the thermal gasification and condensation of waste plastics in the reactor. Computationally, finite element analysis (FEA) was done to see the thermodynamic effects inside and outside the reactor for effective pyrolysis oil production. Once successfully built, this will act as a model to aid environmental sanitation and the creation of jobs in developing countries.

Biography
Okocha Stephen is undergoing his PhD at the age of 29 years from the University of Port Harcourt under the African Centre of Excellence (ACE) scheme. He studied his masters under the center of Gas, Refining and Petrochemicals, UNIPORT and has his foundation as a Mechanical Engineer. He has been a researcher for years helping in arresting the fuel scarcity in his country using Modular Refineries. His love for Energy has pushed him into researching on energy types, sustainable energy and the Oil/Gas industry. He has attended several conferences in Chemical Engineering which focuses on oil, Gas and Energy studies.

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