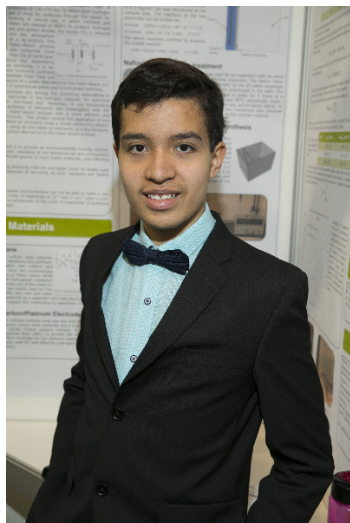


CWSF 2017 - Regina, Saskatchewan



Edward Lombo

Electrochemical Synthesis of Ammonia

Challenge: Environment

Category: Junior

Region: Bay Area

City: Oakville, ON

School: St. Andrew E.S.

Abstract: A low-cost environmentally-friendly alternative method for ammonia synthesis was developed using an electrochemical cell consisting of Platinum/Carbon and graphite electrodes and a Nafion membrane; operating at ambient temperature and pressure. This process is cleaner, industrially-scalable and can replace the age-old Haber-Bosch process that emits more CO₂ than ammonia. Ammonia was formed at a comparable rate of the current Haber-Bosch process and of other similar studies.

Biography

I am currently in grade 8 at St. Andrew Catholic School in Oakville, Ontario. I enjoy playing soccer, and basketball. I am interested in chemistry, mathematics, and physics. I have taken several courses in Chemistry and Biochemistry using online platforms provided by University of Kentucky, and HarvardX. From that experience, I especially got interested in Electrochemistry and its potential to synthesize common inorganic chemicals. At the Bay Area Science and Engineering Fair, my project received several awards including the Chemical Institute of Canada Award, the Primary Fluid Systems Award, the Nikola Tesla Honourable Mention Award, and the Gold Merit Award. My project was inspired by the immense amounts of contaminants generated by the Haber-Bosch Process and finding an environmentally-friendly alternative. This motivates me to find alternatives to this process using the principles of electrochemistry. The results show very interesting opportunities for future research and I plan to further develop this method with the goal of replacing the Haber-Bosch process in the ammonia industry. My suggestion to other students is to find an issue that you are passionate about, learn all of the science behind it, and find a good solution to your issue.

Awards

Value

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|---|---------|
| Excellence Award - Junior - Bronze Medal Sponsor: Youth Science Canada | |
| Western University Scholarship Bronze Medallist - \$1000 Entrance Scholarship Sponsor: Western University | \$1 000 |
| Total | \$1 000 |