water samples collected from five wells within Birshi Gandu and selected part of the Federal Polytechnic, Bauchi. The five sample were collected using sterilized sample bottles were analyzed at RUWASSA (Rural Water Supply and Sanitation Agency) laboratory, Bauchi within 3hrs after collection to check the well water quality. From the analysis of well water samples A B C D and E, the values of pH are 6.78, 6.61, 6.13, 6.30 and 6.86, the turbidity of well samples A, B, C, D, and E are 5.7, 20, 19 and 15 NTU, the sample temperatures ranged between 27.2ºC and 28.6ºC, free Chlorine ranged from 0.06 and 0.39mg/l, the total solid (TDS), ranged between 87.8 and 112.8mg/l. All these values including the amount of Iron values of 0.07 to 0.85mg/l, and cyanide values of 0.002 to 0.026mg/l, fell within the World Health Organization (WHO), Nigerian Standard for Drinking Water Quality (NSDWQ) and National Agency for Food and Drug Control of Nigeria (NAFDAC) standard, the well water samples obtained from Federal Polytechnic, Bauchi meets the bench mark of portable water but water from wells in Birshi Gandu is not adequate for drinking and we recommend treatment of the wells and a boreholes be drilled for the community.

Keywords: Water sample, analysis, WHO, NAFDAC, projected population, RUWASSA.

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SYNTHESIS AND OPTIMIZATION OF BLENDED FIRECLAY-CHROMIUM-SILICON CARBIDE FOR CRUCIBLES

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ABSTRACT
Crucibles are produced through a proper blend of naturally occurring substances. This study characterized Ikorodu clay (Lagos state), graphite, silicon carbide, and chromium for the production of crucible pot, through varied mixing proportions of the constituent elements, categorized into three: A is 50:10:10; B is 40:20:10 and C is 40:10:20,representing the proportion of fire-clay, chromium and silicon carbide respectively. The specimens were blended and sintered with hydraulic press and dried at room temperature, followed by firing in an electrical furnace at a temperature of 1000°C for 3hours.The specimens were then subjected to a physio-mechanical and refractoriness tests using standard procedures for compressive strength, hardness, bulk density, and porosity. It was discovered that porosity varies inversely with bulk density. It is evident from the results that the compressive strength, hardness and porosity decreases as fire-clay content of the specimen is reduced from mixture design A to C; considering 1.2 to0.58 MPa, 289 to 261 Hardness Leed Device (HLD), and 32 to 21 % for compressive strength, hardness and porosity respectively. Design of experiment (DOE) was adopted for the optimization of various parameters used in the experimental process. The approach provides useful insights in mixture design technique applicable in diverse mixture designs especially in crucibles or composites making. The optimal mixing proportion of the major elements for production of crucible pot was found to be approximately44, 16 and 10 percent by weight for fireclay, chromium and silicon carbide respectively with an optimum desirability of about 0.6.

Keywords: crucibles, refractoriness, optimization, graphite, silicon carbide, composites