

## TECHNICAL CLUB: PLASMA APPLICATIONS

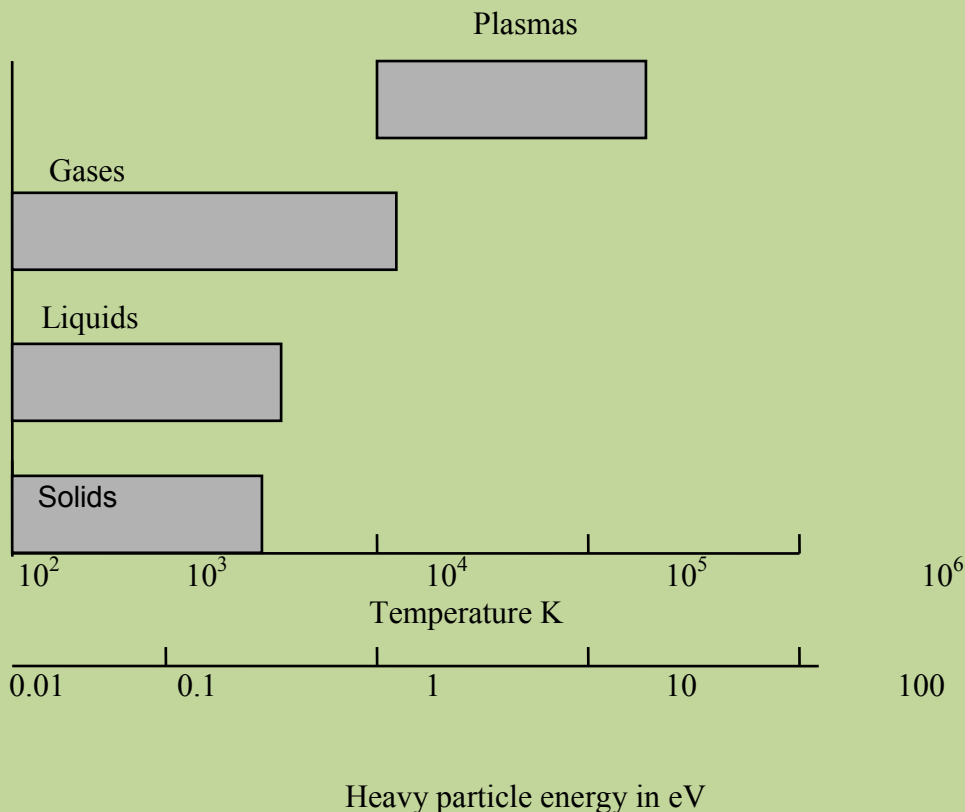
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### TECHNICAL BACK GROUND AND UTILITY OF THE CLUB

WE ALL KNOW ABOUT THE THREE FAMILIAR STATES OF MATTER THAT ARE ; SOLIDS, LIQUIDS AND GASES. TAKE AN EXAMPLE TO UNDERSTAND FOURTH STATE OF MATTER THAT IS PLASMA. WHEN WE HEAT ICE, HEAT WEAKENS THE INTER MOLECULAR BOND AND WE GET LIQUID WATER. HEAT IT MORE, MOLECULES EVAPORATE, BONDS BREAK AND WE GET STEAM.



IF FURTHER HEATING IS CARRIED OUT BY SOME MEANS (ELECTRICAL, CHEMICAL, SHOCK ETC.) THEN THE STEAM MOLECULES DISSOCIATE TO FORM ATOMIC OXYGEN AND

HYDROGEN AND AS THE TEMPERATURE INCREASES WITH CONTINUOUS ADDITION OF ENERGY, THE ATOMS GET IONIZED, I.E. THE BOND BETWEEN THE ATOMIC NUCLEUS AND THE OUTERMOST ELECTRON BREAKS RESULTING IN A MEDIUM OF FREE ELECTRONS AND POSITIVE IONS. IT WAS OBSERVED THAT WHEN ALL THE ATOMS ARE STRIPPED OFF, THE SYSTEM IS FULLY IONIZED AND EXHIBITS BEHAVIOR THAT ARE RADICALLY DIFFERENT FROM THE NORMAL HOT GASES. THIS IS ONE WAY OF DESCRIBING PLASMA. IN THE SOLID, LIQUID, AND GASEOUS FORM OF MATTER ELECTRONS ARE BOUND TO THE ATOMIC NUCLEUS. PLASMA IS CREATED WHEN ENOUGH HEAT IS APPLIED TO REMOVE THE ELECTRONS, WHICH ARE NOW FREE. IT IS THIS FORM OF MATTER THAT IS USED IN THE FUSION PROCESS OF THE SUN. EXAMPLE OF PLASMAS ON EARTH IS FLUORESCENT LIGHTS ARE MAN-MADE PLASMAS WHEREAS LIGHTENING IS AN EXAMPLE OF NATURALLY OCCURRING PLASMAS.

THERE ARE NUMBER OF INDUSTRIAL APPLICATIONS WHERE THE USE OF PLASMA-BASED TECHNOLOGIES OFFERS DISTINCT ADVANTAGES OVER OTHER CONVENTIONAL TECHNOLOGIES. SOME APPLICATIONS OF PLASMAS IN INDUSTRY ARE:

- (1) PLASMA-BASED ETCHING AND DEPOSITION IN SEMICONDUCTOR INDUSTRY (WAFER PROCESSING)
- (2) DEPOSITION AND POLYMERIZATION (FOR OPTICAL FIBERS, FIBROUS MATERIALS, ETC.
- (3) SURFACE MODIFICATION (DEPOSITION OF DIAMOND AND DIAMOND-LIKE FILMS, CORROSION RESISTANT COATINGS.
- (4) PLASMA IMMERSED ION IMPLANTATION, PLASMA NITRIDING, CARBURIZING.
- (5) HIGH-PRESSURE ARCS AND JETS FOR CERAMIC COATINGS AND PLASMA PYROLYSIS APPLICATIONS.
- (6) FLAT PLATE DISPLAYS, ETC.

THE ASSOCIATION WITH THIS CLUB WILL CREATE INTEREST OF STUDENTS IN THIS TECHNOLOGICAL DOMAIN AND INSPIRE THEIR CREATIVITY TO INNOVATE THROUGH PRACTICAL LEARNING AND APPLICATION ORIENTED MINDSET.

### **ACTIVITIES TO BE CONSIDERED UNDER THE CLUB :**

THE ACTIVITIES OF THE CLUB HAVE BEEN WELL FORMULATED TO DEVELOP INTEREST AND COMPETENCE OF THE STUDENTS IN THE RELATED TECHNOLOGIES WITH EMPHASIS ON APPLICATION ASPECTS OF THE CONCEPTS. FOLLOWING ACTIVITIES HAVE BEEN CONSIDERED ;

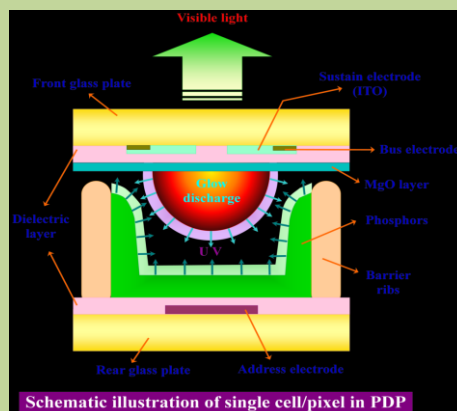
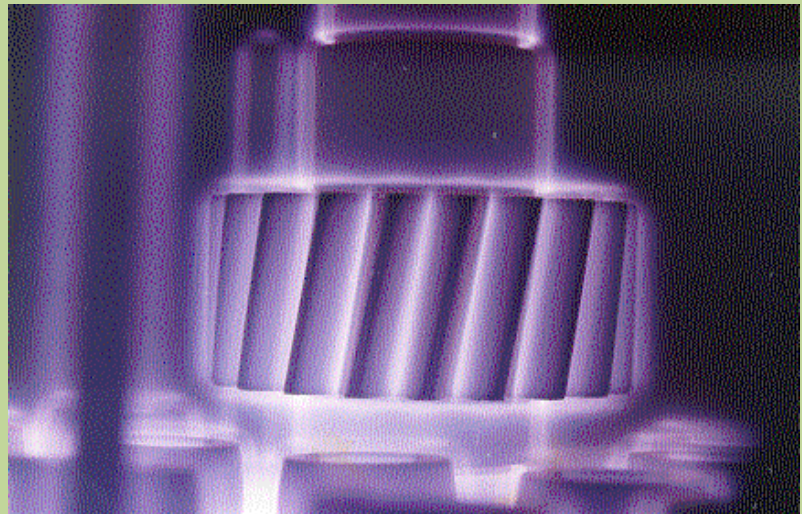
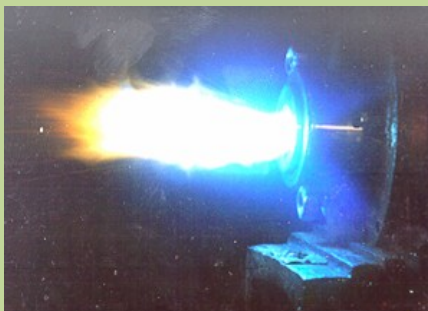
- LEARNING THROUGH TECHNICAL MAGAZINES AND JOURNALS-
- DEVELOPING UNDERSTANDING ON PLASMA AND ITS APPLICATIONS AND

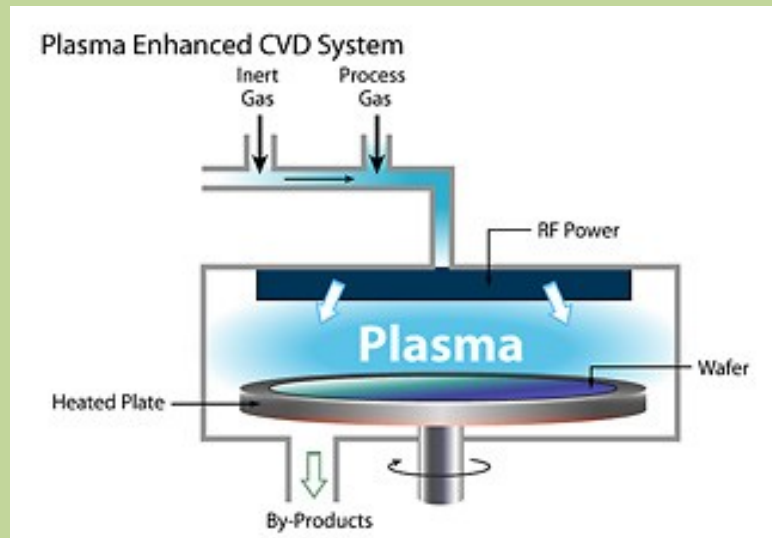
## VACUUM TECHNOLOGY.

- DESIGN AND PRACTICAL MODELING OF RELEVANT DEVICES
- PAPER WRITING & PRESENTATION
- QUIZ AND GROUP DISCUSSIONS ON THE CLUB THEME RELATED TOPICS
- CONDUCTION OF WORKSHOPS AND PRACTICAL TRAINING SESSIONS
- INTERACTION WITH EMINENT INDUSTRIAL AND ACADEMIC EXPERTS IN THE DOMAIN OF CLUB THEME
- INDUSTRIAL AND INSTITUTIONAL - TOURS
- CONSIDERING INDUSTRIAL R&D PROJECTS IN THE DOMAIN OF CLUB THEME

## PLASMA APPLICATIONS

### **ARC PLASMA: WELDING AND CUTTING APPLICATION**





SOME IMAGES OF TECHNOLOGICAL DEVELOPMENT IN THE CLUBS DOMAIN