Palash Kulkarni **10D110037**
Metallurgical Engineering and Material Science **UG fourth year**
IIT Bombay **Male**
Specialization: Ceramics and Composites **DOB: 19/09/1992**
CGPA: 8.01

Academic Achievements

- Recipient of the prestigious **National Talent Search** scholarship awarded to only 500 students nationwide (*2009*)
- Secured **All India Rank 22** in National Science Olympiad (*2008)*
- Awarded merit by central government for being in top 0.1% in English in Intermediate exam with a score of 96/100 (*2010*)

Previous Internship Experience

JFE Steel, Fukuyama-shi, Japan

Coated Steel Research || Mr. Yusuke Fushiwaki *(May-July, 2013)*

- Analyzed the **influence of Silicon and Manganese** content in base steel on the quality of zinc coating on galvanized and galvannealed steel
- This involved testing the steel samples for **segregation, mechanical properties and corrosion resistance**
- The steel samples were thus characterized by Tensile test, Bend test, X-ray diffraction, X-ray Photoelectron Spectroscopy Glow Discharge Spectroscopy, SEM analysis, TEM analysis and Salt Spray Test
- Influence of **pre-strain in base steel sample**, on the **galvanizibility of steel** was also analyzed, with respect to wetting during hot-dipping method

Current Research Project

Preparation of Magnesium Oxide/Oxide Nano-Composites by Solid State Precipitation route

(Jan, 2014 -)

- **MgO nano-powder** from Magnesium Nitrate ($MgNO_3.6H_20$) precursor was prepared via **Hydrothermal method** route
- The powder was combined with **Fe-oxide powder** and subjected to sintering and aging for different sintering temperatures and aging durations respectively
- The incorporation of Fe-oxides **improved the mechanical properties** over MgO powder (without Fe-oxide) considerably (especially Vicker Hardness)
- The influence of Fe-Oxides on other properties of MgO (like wear resistance) is being studied

Major Projects

1. **Powder Ceramics : Synthesis and characterization of Mullite**

   Professor – Prof. TRS Prasanna, Prof. Parag Bhargav *(Jan-April, 2012)*

   - Produced **Mullite ($3Al_2O_3.2SiO_2$) powder**, starting from precursors of nano-sized Silica (**SiO_2**) and Alumina (**Al_2O_3**) **and mixing them in required stoichiometry**
   - The mixed powder was subjected to ball milling with Poly-vinyl-alcohol as the dispersant and Alumina balls as the grinding media for 24 hours followed by solid state fusion in an electric arc furnace
   - Performed **X-Ray Diffraction (XRD), Dynamic Light Scattering (DLS) and Brunauer-Emmett-Teller method (BET)** to characterize various properties of the Mullite powder

2. **Steel Making: Influence of heat treatment on microstructure and properties of different grades of steel** (*July-Nov, 2012)*

   Professor – Prof. R.C Prasad

   - Compared Ferrite and Pearlite content when as received samples of different carbon compositions were **annealed , normalised and water quenched** and microstructures were analyzed with the help of **optical microscope and SEM images**
   - All samples were subjected to tensile testing till fracture, to know various mechanical parameters viz. **ultimate tensile strength , yield strength and ductility**
   - Fractographs were analyzed under SEM to get an insight of **ductility and failure modes**

Relevant Courses

- **Ceramics and Powder Metallurgy:** Advanced Ceramics, Ceramics Processing, Powder Metallurgy, Glass and Glass Ceramics, Characterization techniques in Material Science
- **Other relevant courses:** Science and Technology of Thin Films, Semi conductor devices, Extractive metallurgy, Iron and Steel making, Control Theory, Transport Phenomenon, Mechanics of Materials, Structure of Materials, Thermodynamics of Materials, Kinetics of Processes, Phase Transformation, Mechanical behaviour of Materials, Entrepreneurship in Material Science
- **Mathematics Courses:** Calculus, Differential Equations, Linear Algebra, Numerical Analysis

Extra-Curricular activities and Positions of Responsibility

- Won 2nd prize in **Documentary making competition** organized by St. Xaviers' college in Mumbai for a documentary on 'Global Warming' *(2011)*
- **Wrote and Directed a Musical Play** for Performing Arts Festival of the university which fetched first position *(2013)*
- **Former Media and Public Relations Head** at Mood Indigo, Asia's largest college cultural festival *(2012)*
- Currently heading **IIT Bombay Radio** *(2013-)*