

# Department of Materials and Metallurgical Engineering South Dakota School of Mines and Technology

## Slag Information

- Acid slags require acid refractories
- Basic slags require basic refractories
  
- Use basic slags to remove acidic impurities. This means P in steelmaking.
- Use acidic slags to remove basic impurities. Not so important since the driving force (Gibbs energy) for oxidation of basic components is typically very favorable.
  
- Acid slags are viscous because of the silica network.
- Basic slags are fluid because they are ionic.
  
- Basic flux added to an acid slag snips the silica network into smaller pieces thereby making it more fluid.
- Acid flux added to a basic slag lowers its melting point to workable temperatures.

In order of Decreasing Basicity – Less  $O^{2-}$  (Decreasing ionic bond fraction)

- Basic components:  $Na_2O$ ,  $BaO$ ,  $SrO$ ,  $CaO$
- Neutral components:  $MnO$ ,  $FeO$ ,  $ZnO$ ,  $MgO$ ,  $BeO$ ,  $Cr_2O_3$ ,  $Fe_2O_3$ ,  $Al_2O_3$ ,  $TiO_3$
- Acidic components:  $SiO_2$ ,  $P_2O_5$

### The Silica Network:



