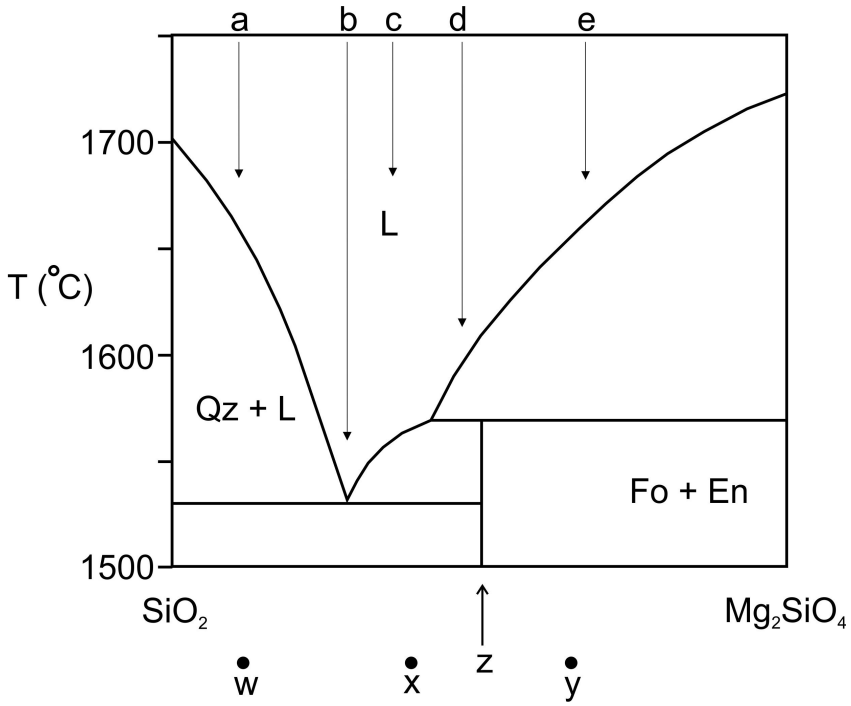
# The system $SiO_2$ - $Mg_2SiO_4$

1. Label the fields that are unlabeled.

2. What composition and what mineral plot where the arrow (z) is shown?




3. Consider melts of compositions a, b, c, d, and e. Fill in the following table to answer these questions:

- If the melt cools, at what temperature will it begin to crystallize?
- At what temperature, will it be half crystalized? (This is tricky for B, C, D, and E. Think.)
- At what temperature will it be completely crystallized?
- After it is done cooling, what minerals will be present and how much (%) or each?

| melt | Liquidus T | 50% T | Solidus T |
|---|---|---|---|
| A | | | |
| B | | | |
| C | | | |
| D | | | |
| E | | | |

4. Consider rocks with compositions shown at w, x, and y. Fill in the following table to answer these questions:

- Which minerals will be present in those rocks at low temperature?
- If heated, when will they begin to melt?
- What will be the composition of the first drop of melt?
- At what temperature will they be completely melted?
- What will be the composition of the final melt? (Give wt%$SiO_2$ and wt%$Mg_2SiO_4$)

| rock | minerals | solidus T | first melt comp | liquidus T | final melt comp |
|---|---|---|---|---|---|
| w | | | | | |
| x | | | | | |
| y | | | | | |