

**Department of Materials Science and Engineering  
Massachusetts Institute of Technology  
3.14/3.40 Physical Metallurgy – Fall 2009**

**Review Assignment #1**

**Due Wednesday, October 14, 2009**

Four recent research articles have been made available on the course website:

**Group A: Experimentally-oriented articles:**

1. Douin et al., “Direct measurement of the variation in the energy of a dislocation locked in specific orientations”, Acta Materialia, v57 p466, 2009
2. Norfleet et al., “Dislocation structures and their relationship to strength in deformed nickel microcrystals”, Acta Materialia, v56, p2988, 2008

**Group B: Simulation-oriented articles:**

3. Wang et al., “The transformation of edge dislocation dipoles in aluminium”, Acta Materialia, v56, p4608, 2008
4. Jin et al., “Interactions between non-screw lattice dislocations and coherent twin boundaries in face-centered cubic metals”, Acta Materialia, v56, p1126, 2008

**3.14 students: Select one article from the above four, submit one document**

**3.40 students: Select one article from each of the two groups, A & B, submit two documents**

After selecting an article, read it carefully, and think critically about what you have read. You will then prepare a short review of the article, in about 2 pages. About the first third of your review should be a synopsis of the paper, inclusive of methods and main results. The remainder of the review should *offer a critique* of the paper, and present some creative thoughts for future questions to be addressed. For example, some things to discuss may include:

- Does anything in this paper contradict the “textbook” knowledge that you are learning in class?
- Alternatively, does this paper significantly add to our understanding of something to the point where we should add this new knowledge to our textbook?
- Are the methods used in the work sufficient to support the conclusions drawn by the authors?
- Is the logic internally consistent? Do all of the data support the same conclusion?
- Can you suggest a better way to resolve one or more of the open questions in this work?
- Is there a simple experiment that can either refute or substantially support the authors’ claims?
- How general are the conclusions of this paper; are these results to be expected for other metals or materials?
- What doors does this work open for future research?
- What doors does this work open for industrial development or usage of metals?

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