

□ **Polymer Science and Engineering**

A department in the College of Natural Sciences and Mathematics offering the M.S. and Ph.D. in Polymer Science and Engineering.

□ **The Review Process**

This was a standard AQAD review. Reviewers were:

David A. Weitz, chair (Harvard University)
Juan J. de Pablo (University of Wisconsin)
John M. Pochan (Eastman Kodak Co., retired)
David A Tirrell (California Institute of Technology)
John M. Torkelson (Northwestern University)
Lynn M. Walker (Carnegie Mellon University)
Karen I. Winey (University of Pennsylvania)

□ **Main Issues**

The visiting team described Polymer Science and Engineering as “one of the premier departments of its kind in the United States,” and cited its success in attracting “very high quality faculty,” attracting and nurturing junior faculty, securing “extremely competitive grants” from the NSF and other agencies, and a “long history of successful interaction with industry” as dimensions of its strength. The team also observed that “it has been among the leading departments devoted to the study of polymers since its inception,” but has “broadened the range of topics it covers, as the field itself has broadened, and can now be considered a leading department not only in polymers, but also in the more general field of soft materials science.” In conjunction with the visioning process in the College of Natural Sciences and Mathematics, the department identified four new areas of potential growth: nanoscience and technology, biopolymers and biomedical engineering, energy, and green chemistry and engineering. The team strongly endorsed these new directions, but noted that of these the department’s greatest current strength is in nanoscience, and that developing a position of leadership in the other areas will require “significant investment.”

Much of the team’s report focused on these and other resource issues. The team called for additional University support to permit growth of the department through faculty hiring; for a “senior faculty position as a scientific mentor and leader” in one of the new research areas; for “competitive start-up packages” (ranging from \$500,000 to \$800,000 for entry-level faculty to \$1.5 million or more for a senior position); for TAs and course support to promote new undergraduate initiatives; for faculty retention; for forgiveness of overhead charges on certain young investigator awards; and for expanding, remodeling and upgrading research facilities. The team urged that “a mechanism be identified for the PSE department to present their plan for continued excellence and growth directly to the university administration.” The team made specific comments in several areas:

- **Curriculum development.** The team praised the department’s consideration of an undergraduate “polymer concentration” that would allow students in other science departments to take a sequence of polymer science courses. The team described this effort as “a model of academic citizenship and campus leadership,” and called upon the University to provide necessary support.

Departmental directions. The team noted the “absence of a standard, broadly based Materials Science and Engineering Department” at UMass Amherst, and emphasized that UMass ranks as a national leader in the specific areas of soft materials/soft matter. The team concluded, however, that “the university will be best served if the PSE Department maintains

its identity as a department focusing on polymers and/or soft materials rather than trying to compete at a national level as a Materials Science and Engineering Department.”

- **Graduate studies.** The team observed that the department “attracts strong graduate students from the United States and around the world ... with a very diverse set of backgrounds, which provides some challenges for both the students and the faculty during the first year of graduate course work.” Nonetheless, the team found graduate student success to be good and graduates of the program “justifiably highly sought by industrial employers and academic institutions.”

Departmental leadership and governance. The current leadership of the department was found to be “excellent,” but the team saw a need for “mid-level and senior faculty to provide scientific leadership for the department.” The team judged the department to be “well managed and well run,” with an “excellent” environment within the department. The department’s plans were found to be “well aligned with those of the College.”

- **Faculty issues.** The team reported on a number of concerns raised in its meetings with faculty members: “considerable concern over the lack of support provided by the university during the process of proposal submission” from the Office of Grant and Contract Administration; potential faculty retention issues; the manner in which internal competitions (e.g., Young Investigator awards) are managed; and the practice of charging overhead to such awards. The team also noted that the department’s building “is now 10 years old,” and that “the needs of researchers have changed considerably.” The team therefore cautioned that the University “must be prepared to renovate its facilities – even its most modern facilities.”

□ **Response to the Review**

The department expressed agreement with all of the teams main findings and recommendations. With respect to the development of an undergraduate polymer concentration, the department reported on ongoing conversations, but stated that “the faculty is not presently in agreement as to whether such a concentration is feasible or desirable.” The department also reported on discussions related to faculty hiring priorities, resulting in the conclusion that “the next search should be a senior hire in the bio area who would serve as the main focus of various strong but fragmentary efforts.” The Dean endorsed the department’s response.