Advancing Combustion Science (in China)

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Advancing Combustion Science & Technology

• Combustion has been traditionally pursued along two separate directions:
  – Technology: engines, furnaces, boilers, rockets, explosion hazards,…
  – Science: fluid flows with chemical reactions

• Recent advances in combustion science has enabled significant development of combustion technology (e.g. quantitative predictability).
New/Additional Roles of Combustion Science in Energy & the Environment

- Atmospheric chemistry (pollutant formation and dispersion)
- Flows with biological reactions (energy bio-science)
- Flows with nuclear reactions (nuclear energy, supernovae)
- Materials synthesis
Global Efforts at Advancing Combustion Science

• Princeton:
  – AF surrogate fuels program; Netjet program
  – Proposal to DOE to establish Center for Combustion Science ($25M for 5 years)

• Korea: World Class University program

• KAUST: Center for Clean Combustion

• China?
Combustion Research in China

- Emphasized technology development: coal combustion; i.c. engines; aero-engines
- Much less emphasis on combustion science
- Consequences:
  - Under-representation at high-level combustion forums
  - Bottleneck to technology development
  - Inadequate & inappropriate utilization of talents
Agenda for Advancing Combustion Science in China (1/2)

• Hosting of 33rd International Combustion Symposium at Tsinghua in 2010

• Establish Center for Combustion Science
  – Conduct research on combustion science
  – Support development of technologies elsewhere

• Recruit overseas Chinese researchers
  – Junior: Permanent appointment
  – Senior: Part-time appointment
  – Competitive compensation and satisfactory housing
Agenda for Advancing Combustion Science in China (2/2)

- Develop education system for advanced training
  - Near term: opportunity for short-term overseas collaborative visits at leading institutions
  - Long term: self-sustaining, world class

- Resources
  - Financial: plentiful
  - Talent: plentiful
  - Commitment: ?