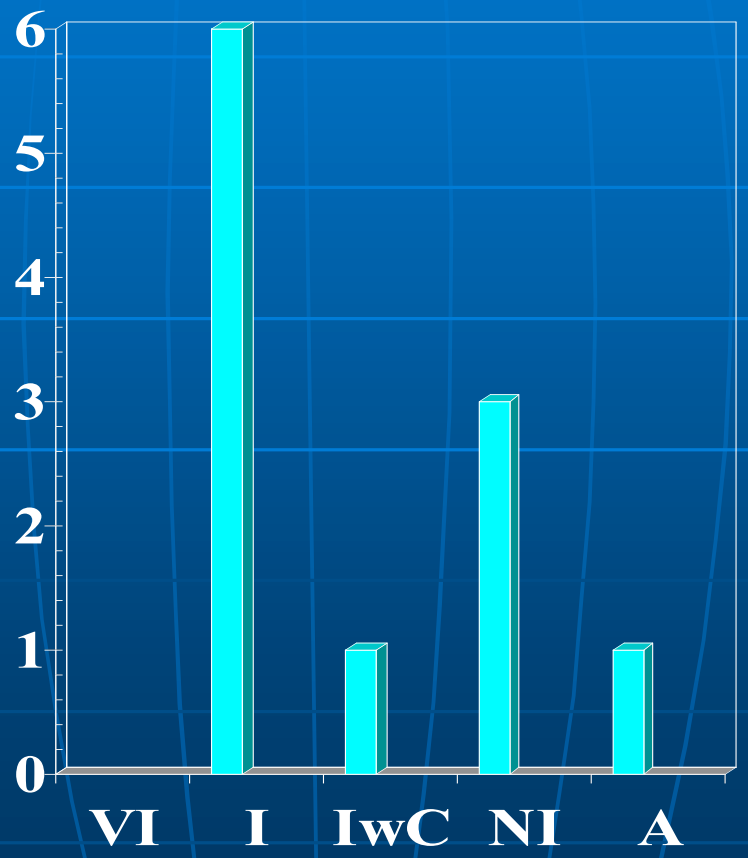
University of Virginia

Laser Micromachining of Titanium Alloy: Lin, Wong, Gupta

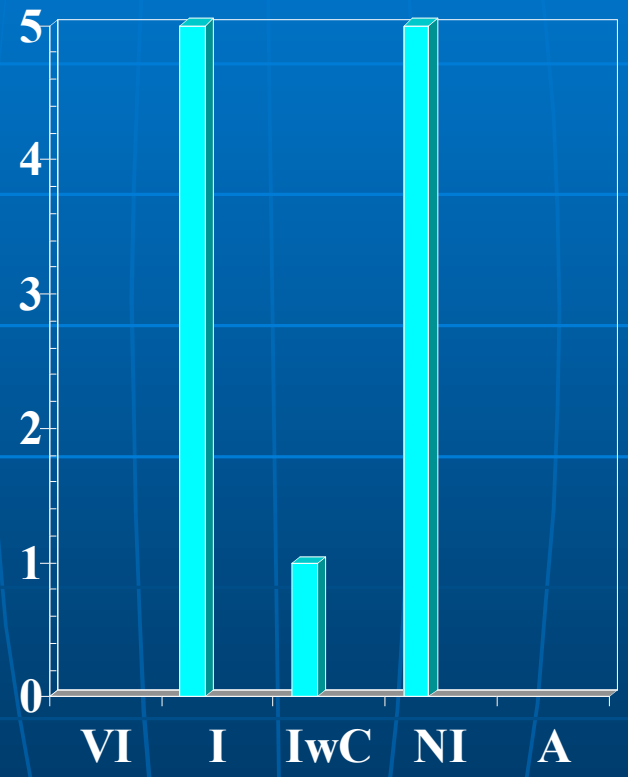


Laser Micromachining of Titanium Alloy: Lin, Wong, Gupta

- Any progress on standardizing the approach for crack profiling/fracture analysis?
- We have to confirm interest with GE Aviation colleagues. We may be very interested. We are less interest in the micromachining and ore in the life prediction though we may be interested to apply the methodology
- Is it possible tha the laser micromachining could be offered as a service for others performing fatigue studies?
  - Suggest market study/survey
  - Flawtech is a company that specializes in flaw implantation primarily using EDM and HIP processes.
  - Contrast EDM vs. LMM results to highlight benefits
- IwC--Interested in the method of creating cracks. It could be used for other materials such as advanced high strength steels for studying fracture behavior. Question: Evidence showing no residual stress + micro structure changes at the edge of the crack where laser beam may alter the base metal.
- Good presentation

Laser Cleaning & Welding of Titanium Alloy:

Lin, Wong, Gupta



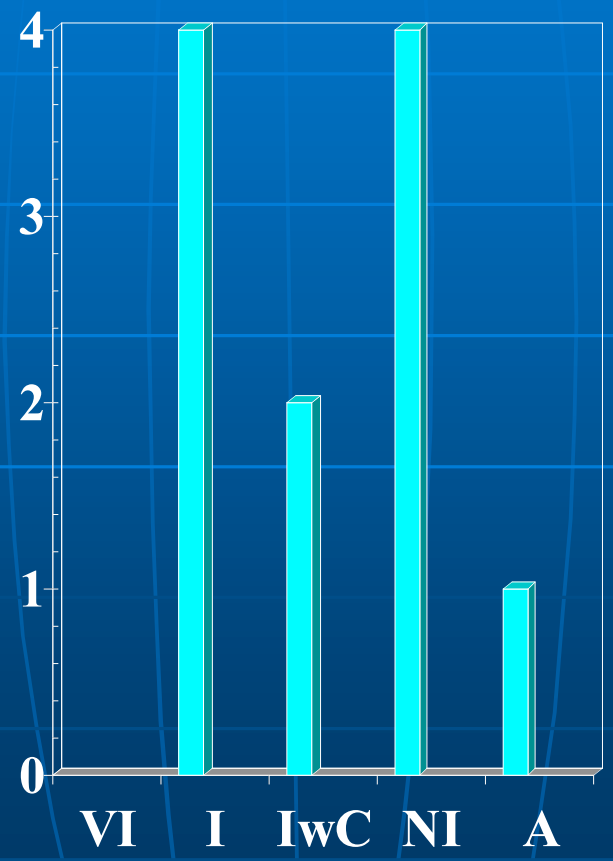
Laser Cleaning & Welding of Titanium Alloy:

Lin, Wong, Gupta

- Claims of benefits need to include quantifiable data
- Interesting opportunity for using the same laser source for cleaning and welding
- Some additional parametric study to explore various laser parameters effect on cleaning and welding would be useful
- May be interested to look at laser cleaning applications. The NAVAIR projects are clearly well coupled to the UVA group. NICE job.. Clear rationale for why you are doing it. Would suggest using a professional laser welding outfit.
- IwC--Explain benefits, ROI. Laser welding? Low cost compared to what?
- Need "business case" comparison of cost, cycle time, and cleaning efficiency compared to current chemical cleaning

Laser Processing of Aluminum Alloys & Composite Materials:

Lin, Dawicke, Bogert, Newman, Gupta



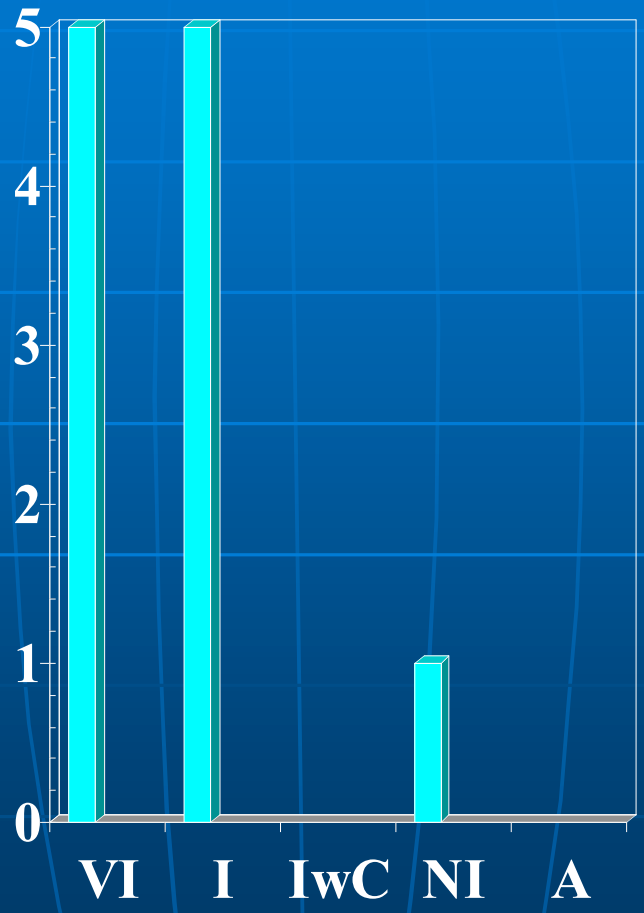
Laser Processing of Aluminum Alloys & Composite Materials:

Lin, Dawicke, Bogert, Newman, Gupta

- Further support for the laser micromachining
  - Expansion of NAVAIR ?
  - Developing an approach for fracture analysis
  - Is there a commercial opportunity?
- Quantify the claimed benefits relative to EDM
- Would like to see evidence (chemical, microstructure, stress) showing the original materials have not been changed at the crack generated for study
- I think more study on how various laser parameters affect the notch profile would be interesting. May be info was collected but not presented?
- Need to understand the laser beam impact on microstructural and chemistry changes of material in the crack
- Can find what I need in either Ti tube work or internal to my organization
- Show carbon fiber composite results

University of Michigan

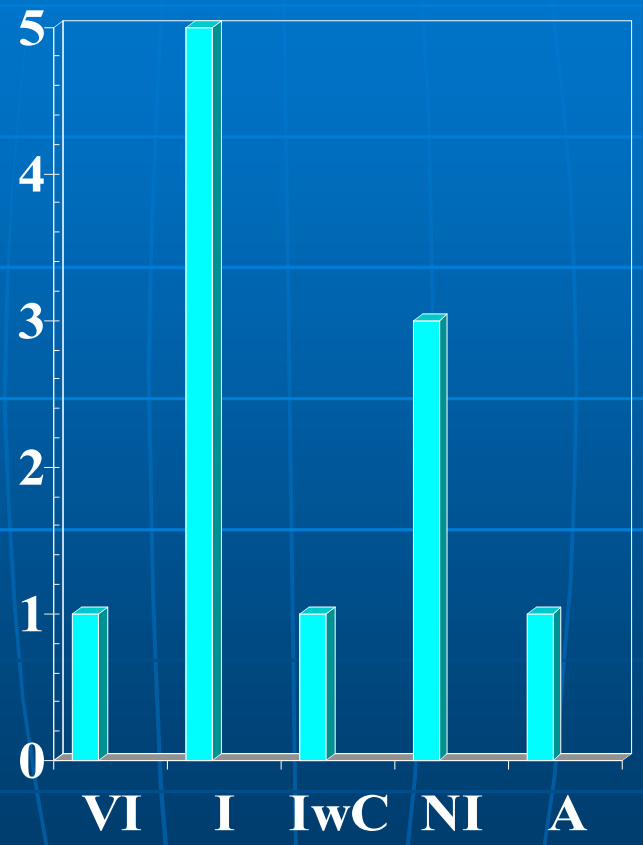
Zero Gap Laser Welding of Galvanized Steel: Dasgupta, Mazumder



Zero Gap Laser Welding of Galvanized Steel: Dasgupta, Mazumder

- Effective experiment using Taguchi method. The differences in gap are clear. The evaluation using SD is good understanding of weld quality
- Great work applying science to practicality!
- Like the spectroscopic diagnostics, particularly choice to do line filters. Your logic is solid, but the results have too much scatter to be practically useful.
- Thorough study, good presentation with promise for applying spectroscopic monitors to correlate/ predict weld quality
- Very good quality presentation. Would like to see future plans clearly identified in slide.
- Can the electron temperature sensor technique be expanded to pulsed laser ablation?
- How does this compare with thermal camera?
- Good presentation.

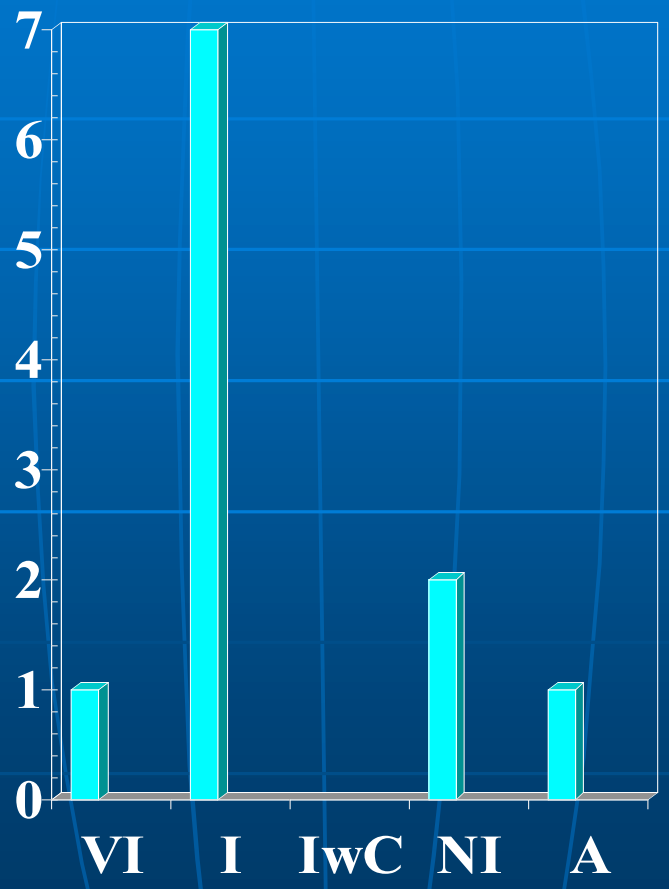
Laser Micromachining of Microfluidic Structures: Kam, Mazumder



Laser Micromachining of Microfluidic Structures: Kam, Mazumder

- Is it truly a single step process? Very interesting work. Details on modeling are of interest.
- Is it possible to see actual flow? I'm interested in how to flow (It's not my work.)
- Interested in results. Could be useful for our company.
- Study etching of Si using deep UV ns pulse laser, e.g., @ 355nm & 266nm
- Good presentation

Thin Film Production by Multienergy Processing Based on Pulsed Laser Deposition Technique: Shin, Mazumder



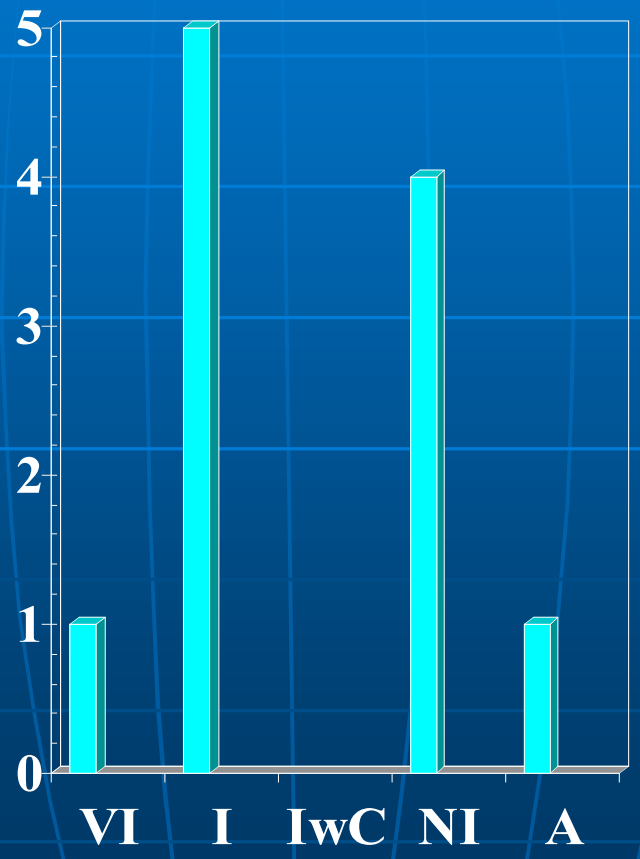
Thin Film Production by Multienergy Processing Based on Pulsed Laser Deposition Technique: Shin, Mazumder

- Potential application in manufacture of piezo and ultrasonic transducers
- Still working with business contacts to figure out what benefits one could have.
- Good presentation
- Interested in (1) surface coatings: corrosion protective coating, tool coatings (wear); (2) materials: shape memory alloys, deposition rate vs. other coating processes, such as CVD, PVD etc.?

Southern Methodist University

Synthesis and Characterization of Laser Metal Powder Deposited Nano Reinforced Surface Coatings for Slurry Erosion Applications:

Yarrapareddy, Hamid, Kovacevic

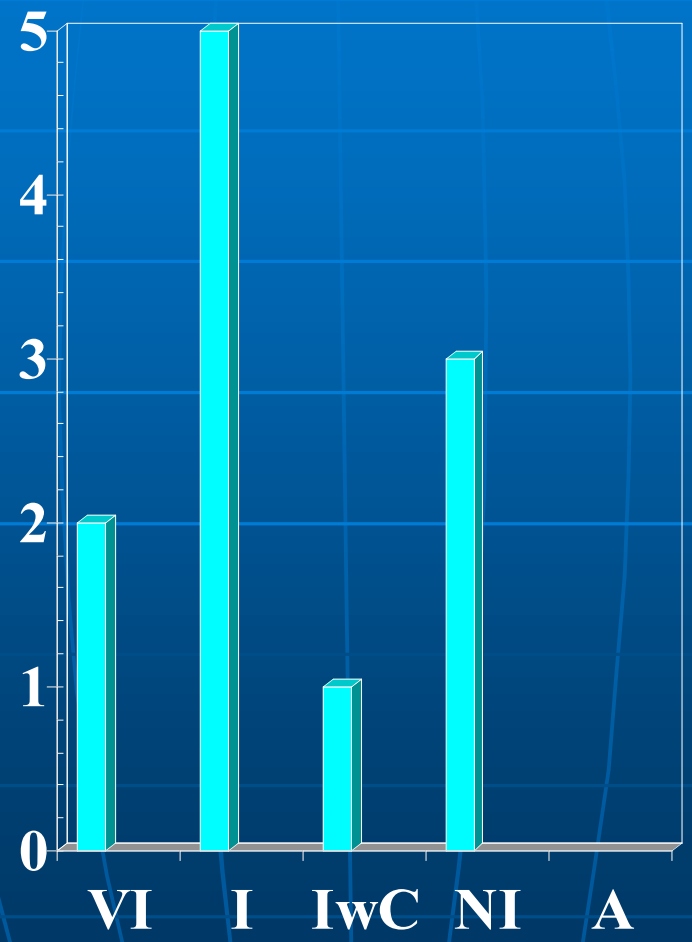


Synthesis and Characterization of Laser Metal Powder Deposited Nano Reinforced Surface Coatings for Slurry Erosion Applications: Yarrapareddy, Hamid, Kovacevic

- What is the failure mode of the tool & coating?
  - How is the adhesion?
  - What's the bonding mechanism?
  - Would like to see the cross section of the interface
- Is the performance improvement supported with economics?
- I think you are seeing agglomeration of nano particles.
- Successful deposition of nano particles
  - More detailed characterization of deposited film appropriate next steps
- Good presentation

Feasibility Study of Laser Welding of Advanced Lightweight Materials:

Lin, Kovacevic, Ruokolainen, et al.



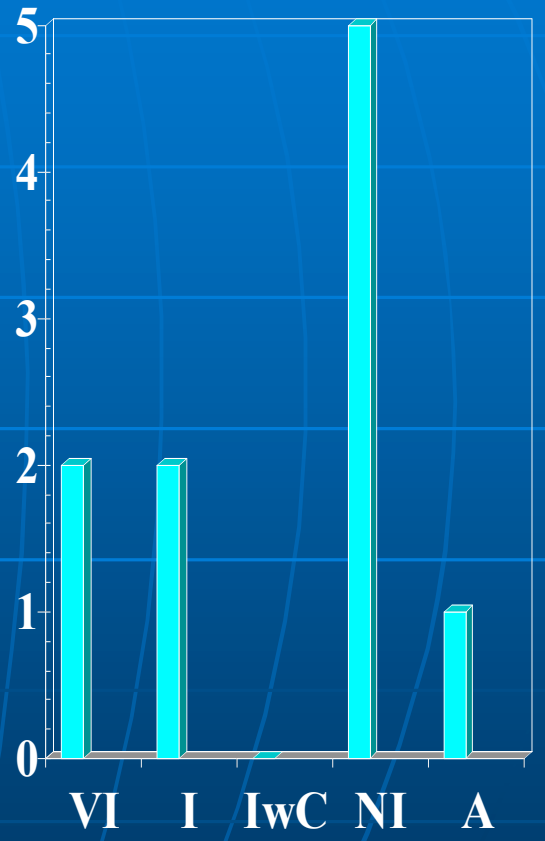
Feasibility Study of Laser Welding of Advanced Lightweight Materials:

Lin, Kovacevic, Ruokolainen, et al.

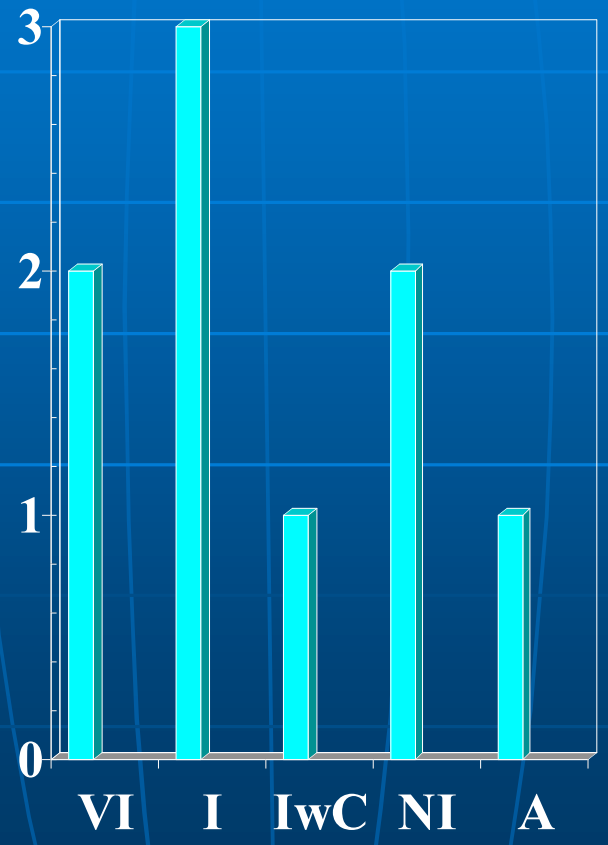
- Demonstration of strong joints but brittle in HAZ results—parameters need further optimization meanwhile to do direct comparison with convention 4KW YAG laser.
- Details of planned heat treatment processes would have been interesting
- Would like to see heat treatment only vs. toughness
- I'm interested in the effect of HAZ
- Good presentation

End

Laser Micromachining Along Grain Boundaries & Stress Corrosion Cracking; Gupta & Payne



Nano-Crystalline Surfaces for Improved Combustion: Bulla, Atreya, Mazumder



Nano-Crystalline Surfaces for Improved Combustion: Bulla, Atreya, Mazumder