

MELT PROCESSING OF MWNT/HDPE COMPOSITE FILMS

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FABRICATION STEPS

- Step 1 – precursor material (CNT/HDPE composite pellets)

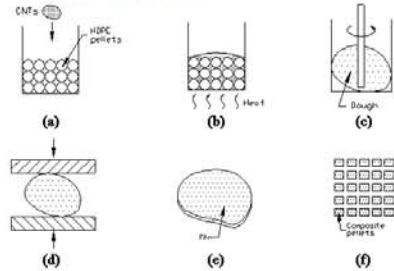


Fig 1. Preparation of precursor material.

ACKNOWLEDGEMENTS

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FABRICATION STEPS - CONTINUED

- Step 2 – mixing (to improve the dispersion of CNTs in HDPE)

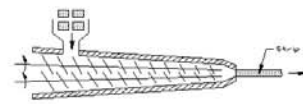


Fig 2. Dispersion of CNTs in HDPE.

- Step 3 – hot pressing (to obtain films of desired thickness)



Fig 3. Fabrication of CNT/HDPE composite film by hot pressing.

SMALL PUNCH TEST

- Test set-up

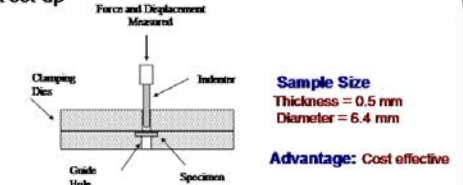


Fig 4. Schematic of small punch test device.

- Typical punch test result

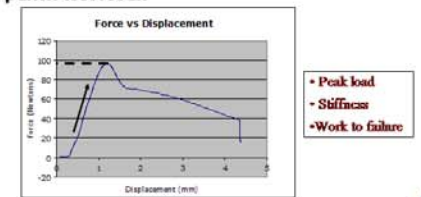
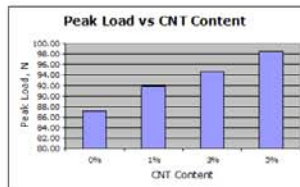


Fig 5. Typical force-displacement curve from punch test.

PEAK LOAD

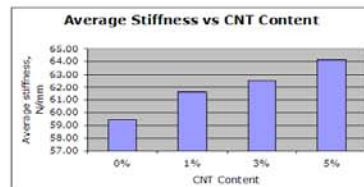
Fig 6. Peak load versus carbon nanotube content.



CNT (wt%)	1	3	5
Peak Load Increase (%)	5.4	8.6	12.9

AVERAGE STIFFNESS

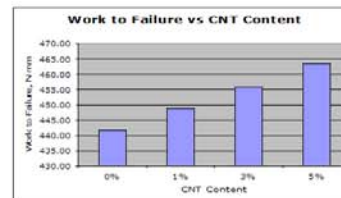
Fig 7. Average stiffness versus carbon nanotube content.



CNT (wt%)	1	3	5
Stiffness Increase (%)	1.6	3.2	4.9

WORK TO FAILURE

Fig 8. Work-to-failure versus carbon nanotube content.



CNT (wt%)	1	3	5
Work-to-failure Increase (%)	3.1	5.6	7.9

DISPERSION OF CNTS IN HDPE

Fig 9. Scanning Electron Micrographs.

