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\*

( / / : / / : )

( )

%

SEM

SEM

%

%

SEM

:

...

Guo et al. & Kanny & Mohan, 2010)

(al., 2007

)

(

)

(

(CNTs)

)

(

(Jiang et al., 2003)

)

(

Rowell et al., 1998 Rana et al., 1998)

(Clemons et al., 2010)

(Clemens, 1995

(Salvetat et al., 1999)

(

(Maldas & Kokta, 1994 Toriz et al., 2002)

(Farsi, 2010)

Younesi et al.

Noguchi et al. (2004) Loos et al. (2008) (2012)

Li et al. (2007)

Manchado et al. (2005) .

(Henriksson et al., 2008)

Shi et al. (2008)

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<sup>1</sup> Carbon nanotubes

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Faruk & Matuana (2008)

( )

/ ± / mm

/ ± / mm

LH0050

/ g/cm<sup>3</sup>

D

/ ) ASTM

/ g/10 min (

(MAPE)

Tavasoli Farsheh et al. (2011)

KJS 111

---

<sup>1</sup> Single wall nanotube

<sup>2</sup> Multi wall nanotube

<sup>3</sup> Low Density Polyethylene

<sup>4</sup> Melt Flow Index

...

/ /  
/ g/10 min

(Kim et al., 2010)

HAKKE

rpm

nm

%

\* \* mm

MAPE		LDPE	
( )	( )	( )	( )

/

ASTM D

( )

/ \* /

± C °

SPSS

$$WA(t) = \frac{W_t - W_o}{W_o} \times 100 \quad ($$

;(%) t = WA(t)  
 ;(gr) t = Wt  
 (gr) = W<sub>o</sub>

SEM

$$TS(t) = \frac{T_t - T_o}{T_o} \times 100 \quad ($$

;(%) t = TS(t)  
 ;(mm) t = T<sub>t</sub>  
 (mm) = T<sub>o</sub>

cm

D

mm/min

ASTM

\* \* mm

Instron- 1186

X

ASTM

D

IZOD

\* \* mm

SEM

X

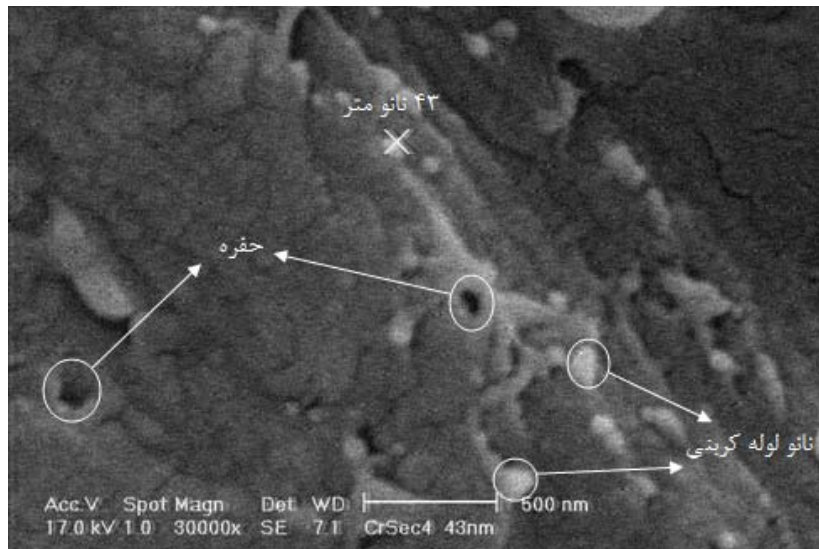
( ) MAPE

XL 30-Philips

<sup>2</sup> Statistical Package for Social Science

<sup>1</sup> Scanning Electron Microscope (SEM)

...



( × )

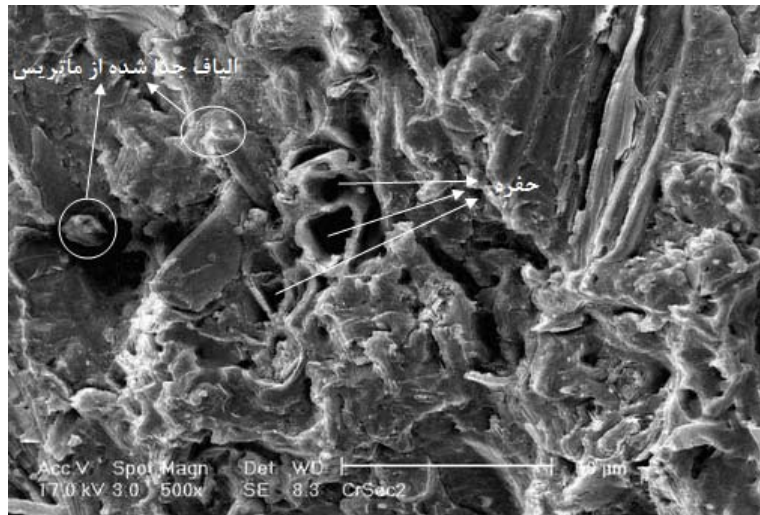


( × )

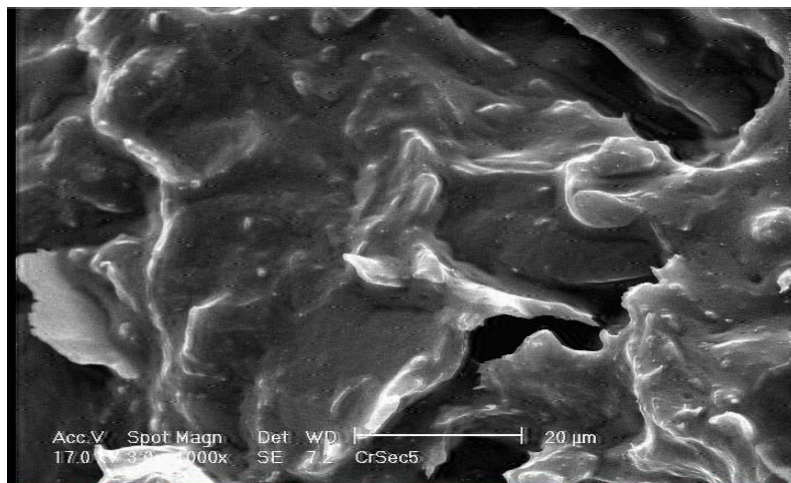
X

X

MAPE



( × )



( × )

SEM





F	F	F	F	F	
/ **	**	/ **	/ **	/ **	(A)
/ **	**	/ **	/ **	/ **	(B)
/ ns	/ **	/ **	/ **	/ **	(AB)

ns

\*\*

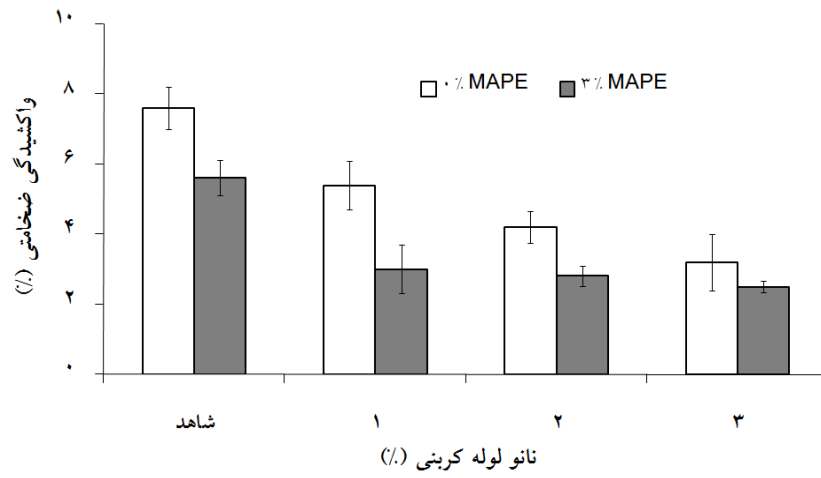
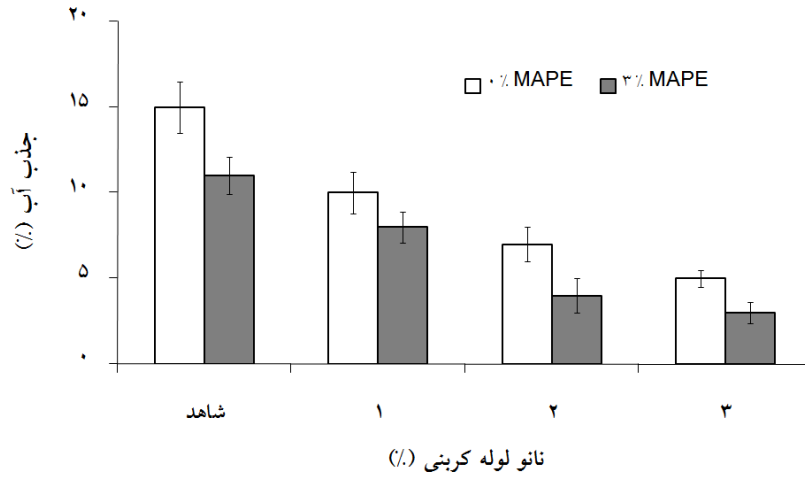
(%)				
/ c	/ bc	/ b	/ a	(%)
/ b	/ ab	/ ab	/ a	(%)
/ a	/ ab	/ ab	/ b	( )
/ a	/ a	/ ab	/ b	( )
/ a	/ a	/ ab	/ b	( )

Espert et al. (2004)

%

MAPE

(Filex et al., 1991)



(Kazemi Najafi, et al., 2010)

(L/D)  
( )

MAPE

( )

SEM

(Tavasoli Farsheh et al., 2011)

a

/

/ /

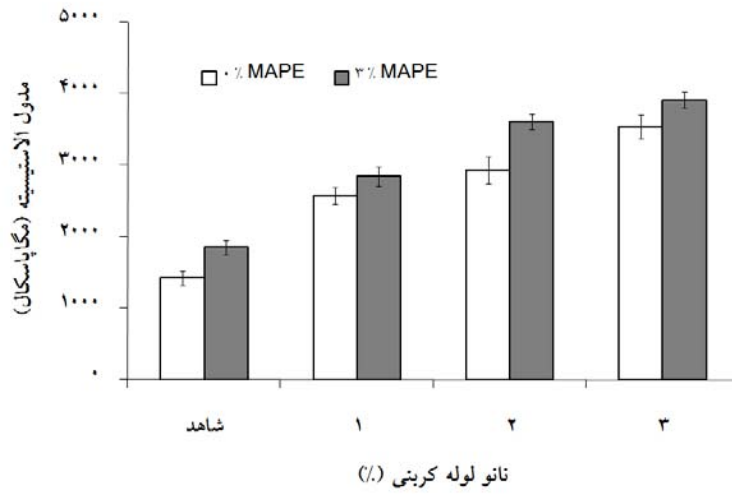
%

ab

MAPE

(Hull, & Clyne, 1996)

MAPE



...

Salvetat et al. (1999)

(TPa)

a

%

MAPE

Li et al. Shi et al. (2008)

(2007)

( )

Prashantha et al. (2008)

Sanadi )

(et al., 1996

MAPE

( )

Chowdhury & wolcott (2007)

(Prashantha et al., 2008)

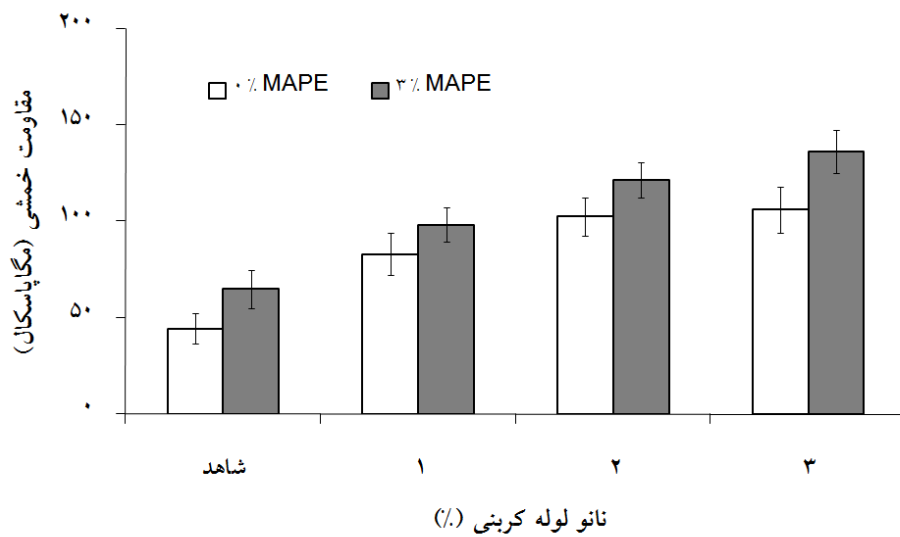
SEM

MAPE

/ /

% MAPE %

MAPE



%

MAPE

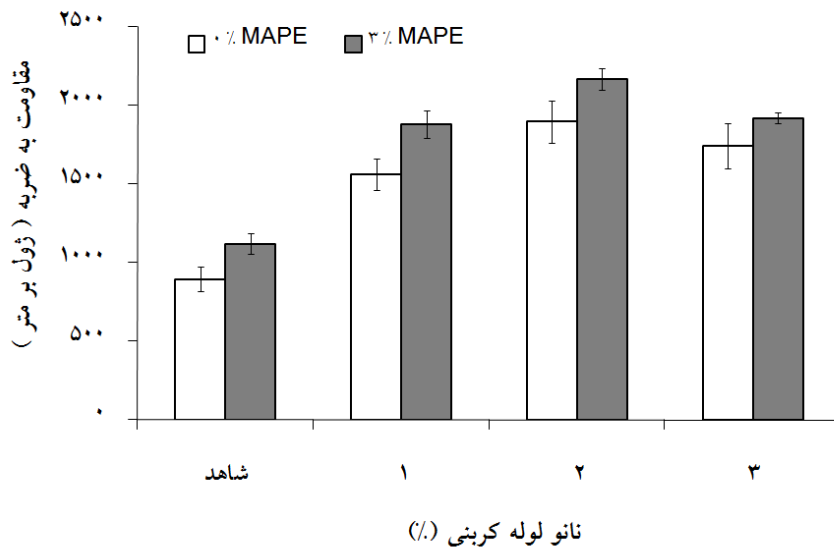
(Makar et al., 2005)

SEM

a

% MAPE %

MAPE



SEM

---

SEM

SEM

%

%

%

%

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## **Effect of Single Wall Carbon Nanotubes on Physical and Mechanical Properties of Wood Fiber- LDPE Composites**

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### **Abstract**

The aim of this research is investigation on influence of single wall carbon nanotubes (SWCNTs) on the physical and mechanical properties of wood fiber- LDPE composites. SWCNTs with 1, 2 and 3 wt% were dispersed in acetone and then in absent and present MAPE ( 0 and 3% wt) were mixed with wood fiber and HDPE by Haake internal mixer and then the wood plastic composites were manufactured by hot press method. The results show that SWCNTs and MAPE improve physical and mechanical properties of the composites. In absent and present MAPE, the composites with 3% SWCNTs exhibited the lowest water absorption and thickness swelling content and the highest flexural modulus and strength, respectively. SEM micrograph showed that, with adding compatibilizer dispersion of fibers and carbon nanotube are improved. The composites with 3% MAPE and 2% SWCNTs exhibited the highest impact strength. Based on SEM micrograph, with increasing carbon nanoyube up to 3%, these nanoparticles are agglomerated in the matrix and provide points of stress concentrations and crack propagation.

**Keywords:** single wall carbon nanotube, wood fiber- LDPE composite, physical properties, mechanical properties, SEM micrograph