

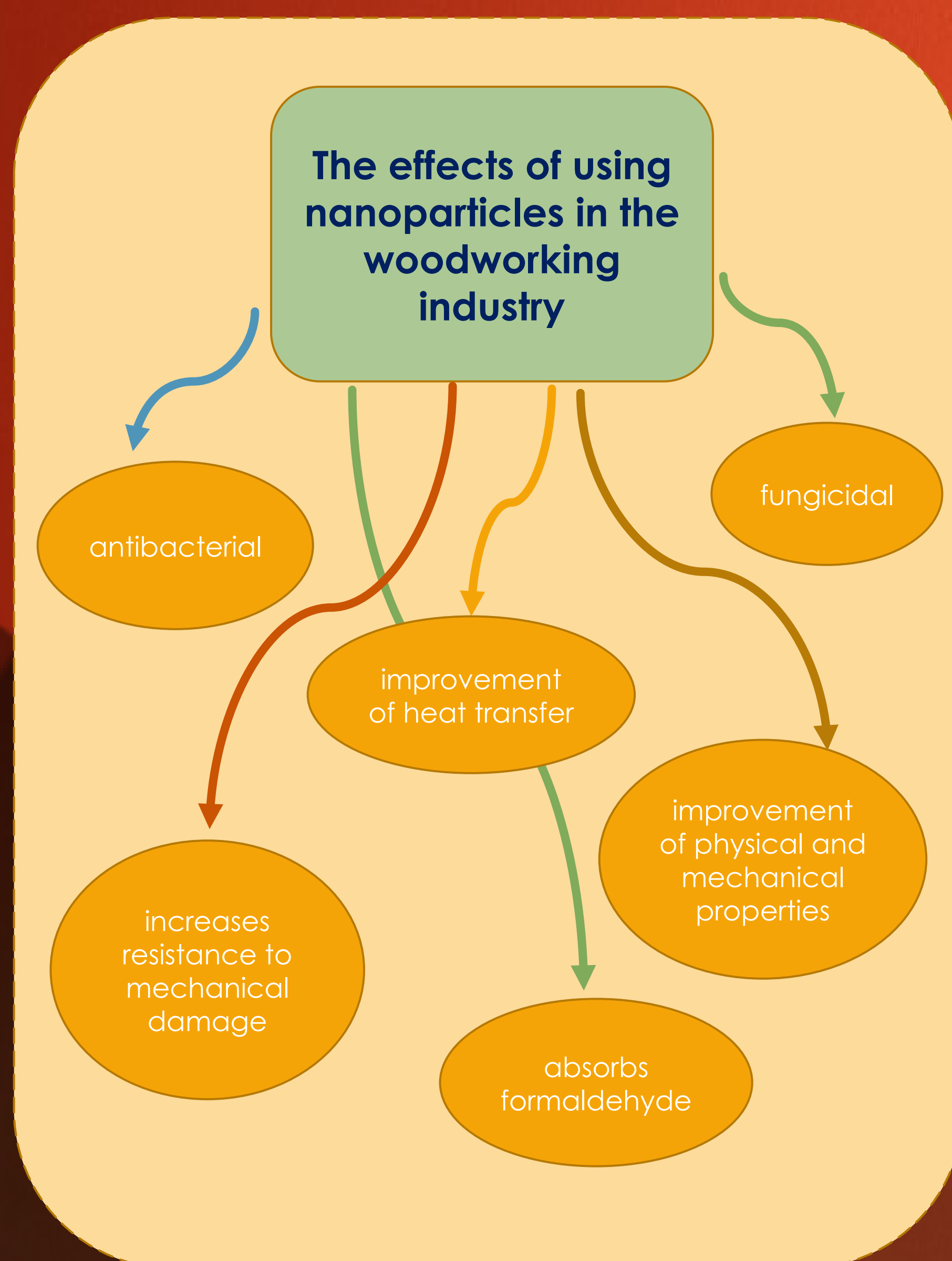
APPLICATION OF NANOPARTICLES OF METAL OXIDES IN BUILDING MATERIALS

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Abstract:

Wood is a natural, environmentally friendly building material that accumulates carbon dioxide, requires less energy for production and resources for processing. It has many advantages, but is very sensitive to biological attacks and negative external factors. One of the ways to increase the service life of wood products and strengthen their internal structure is the use of nanoparticles, in particular alumina (Al_2O_3) and silica form (SiO_2) and etc. The efficiency of Al_2O_3 nanoparticles as a sorbent for removing formaldehyde residues from urea-formaldehyde resin has been proved. The efficiency of Al_2O_3 nanoparticles as a sorbent for removing formaldehyde residues from urea-formaldehyde resin has been proved.



Electrospark processing of metals (Lopatko K., 2015)



Generator of discharge impulses



Plasma channels
($T \sim 10^4 \text{ K}$)



Concentration in colloidal solution $1...7 \times 10^2 \text{ ppm}$

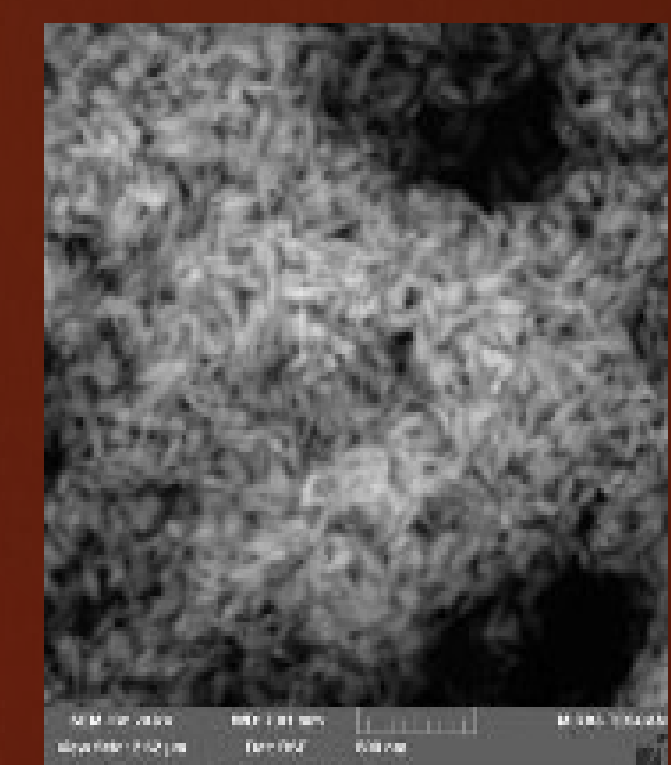
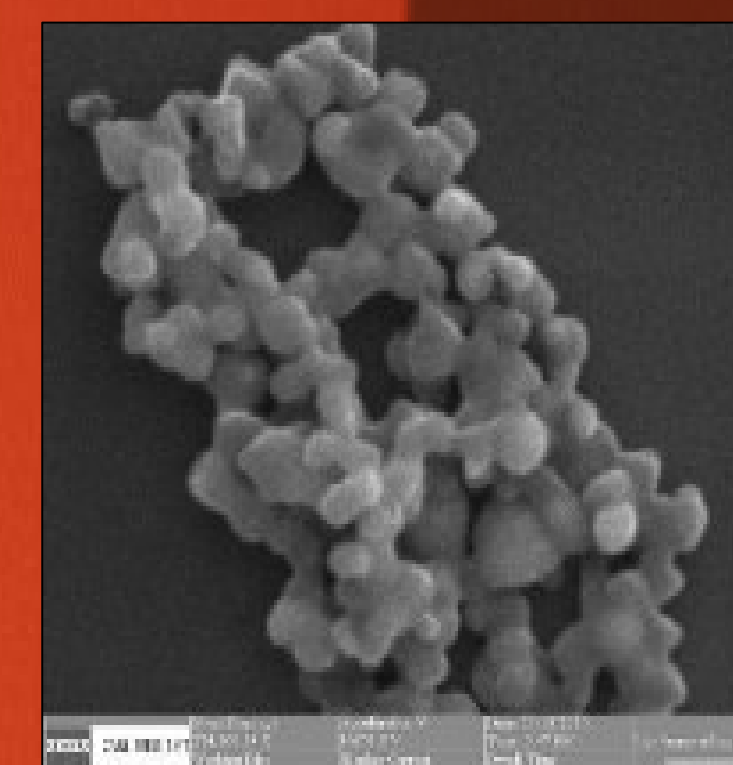
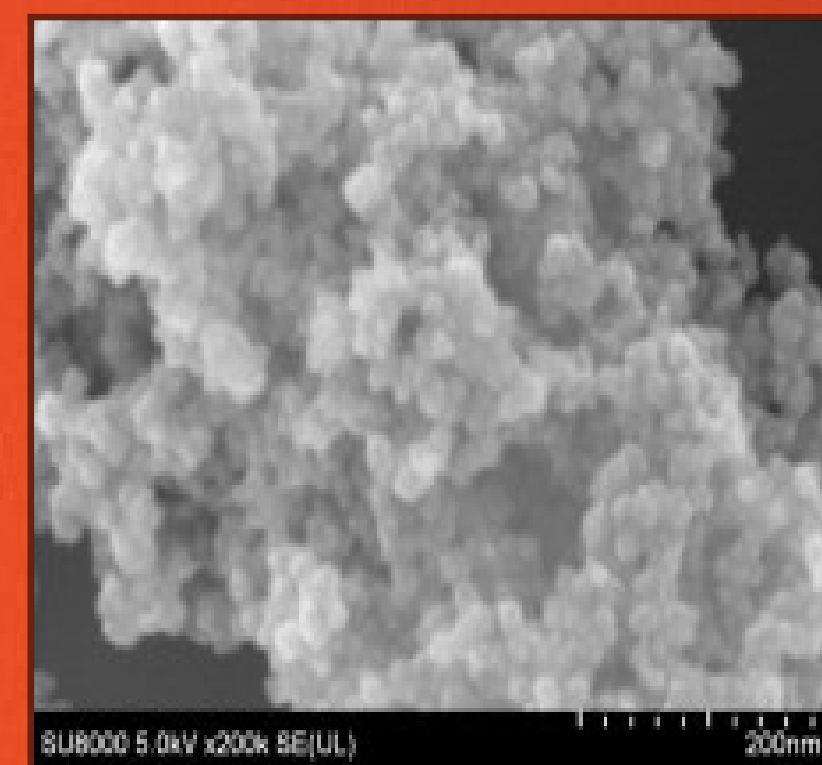
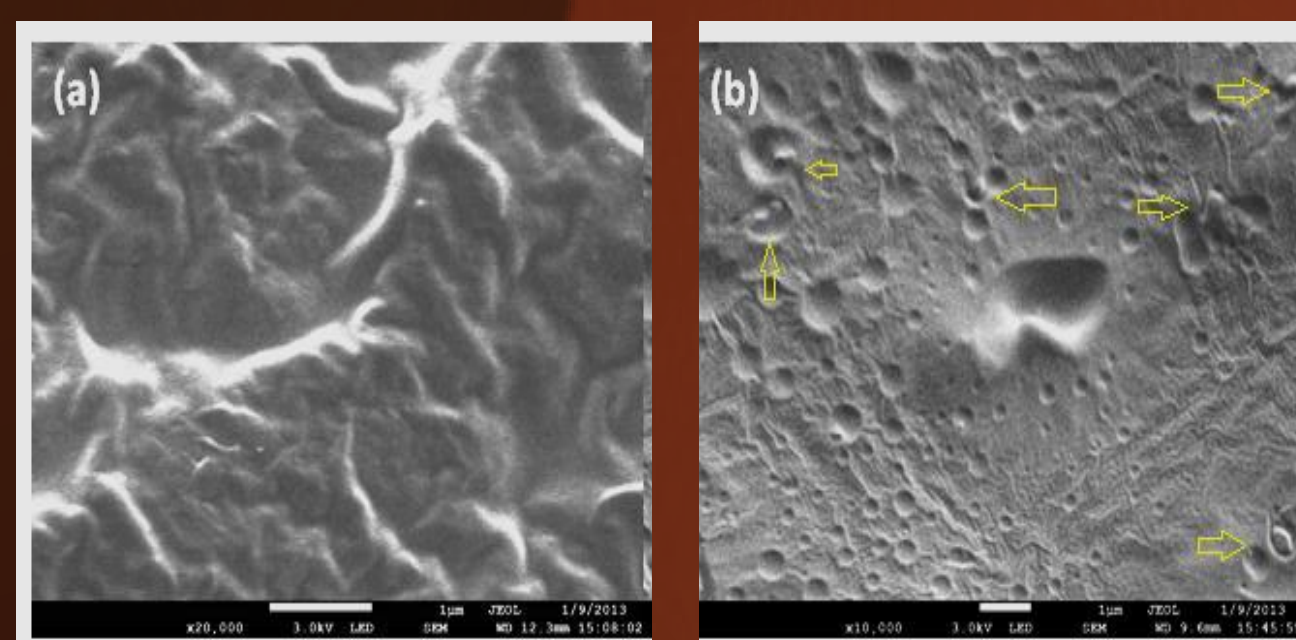
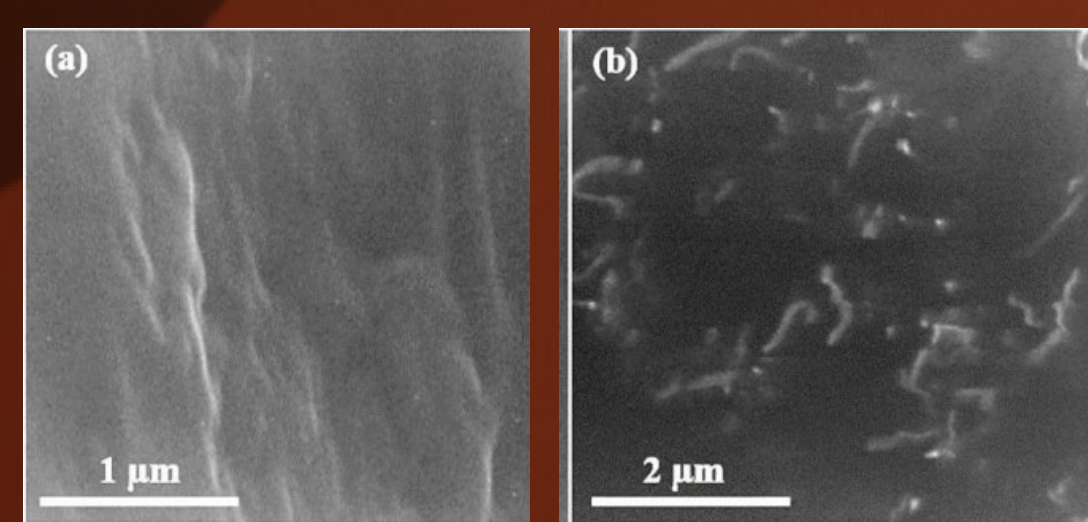


Photo of structure of nanoparticles Al_2O_3 , CuO and MgO in accordance (Lopatko S., 2021)

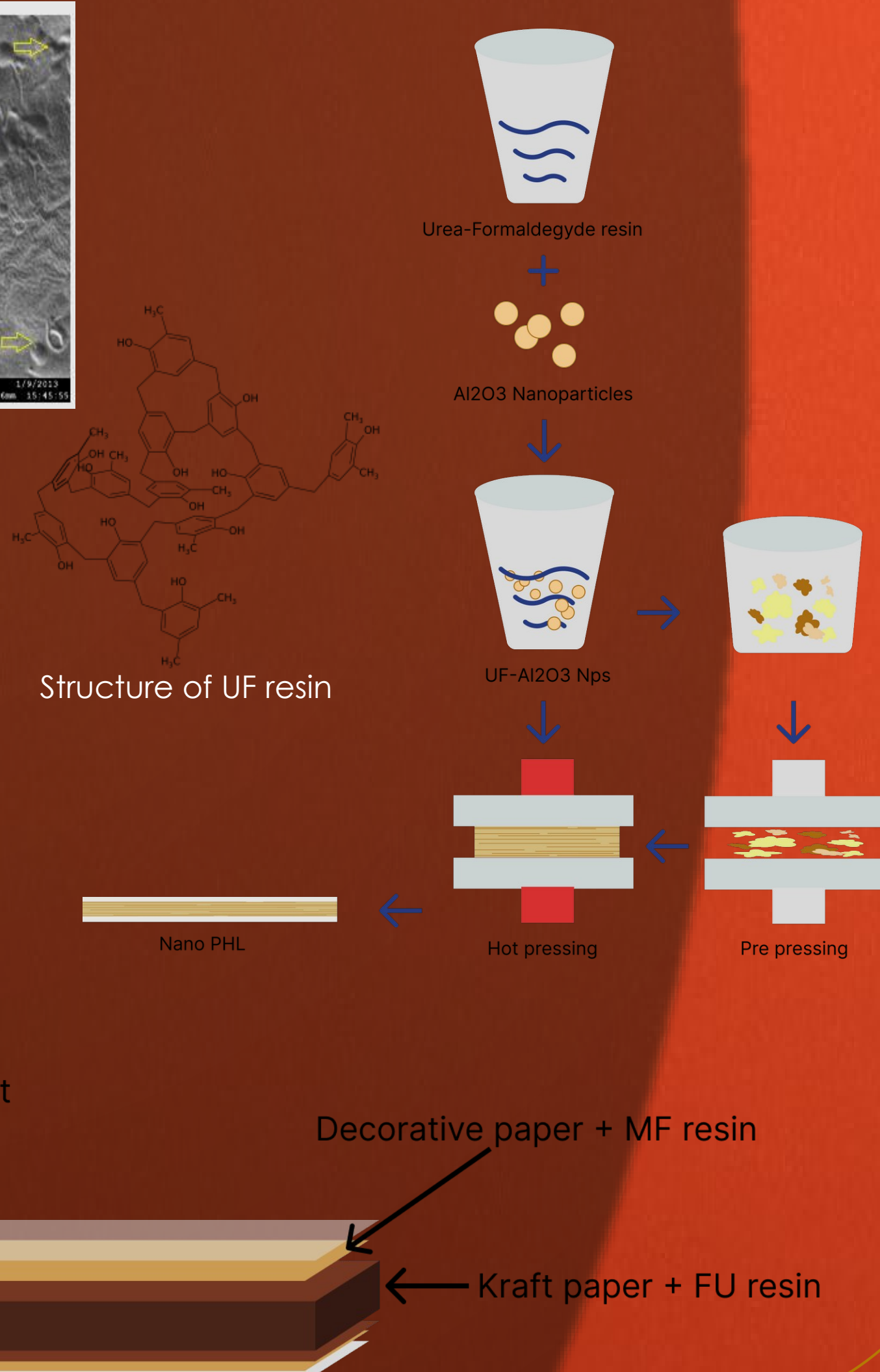
Effect of metal nanoparticles on formaldehyde binding



FESEM images of cured resin (a) UF resin and (b) UF/nanofillers resin (Anuj Kumar, 2013)



Scanning electron microscopy images of (a) cured urea-formaldehyde resin and (b) cured UF-GO nanofillers at 25 k (Waheed Gu, 2021)



Advantages of PHL panels



Examples of the use of PHL panels in the interior and exterior

Thermal insulation

Protection against UV radiation

Resistance to mechanical damage

Noise insulation

Protection against condensation

Durability

Anti-vandalism

Made from recycled materials

Conclusions:

Since most metals are good conductors of heat and their atoms are easily switched to thermal excitation, the thermal properties of nanoparticles this open new opportunities to improving the heat transfer of wood composites, increase the thermal conductivity of wood panels, which reduces compression time. The efficiency of Al_2O_3 nanoparticles as a sorbent for removing formaldehyde residues from urea-formaldehyde resin has been proved