

Transport and Infrastructure Net Zero Consultation Roadmap

Take the survey

Department of Climate Change, Energy, Environment and Water

Response received at:

August 6, 2024 at 12:03 PM GMT+10

Response ID:

sbm2fbb858db97dff17d399f

- 1 Confirm that you have read and understand this privacy notice.
Yes
- 2 Please indicate how and if you want your submission published.
Public and anonymous
- 3 Published name
Not answered
- 4 Confirm that you have read and understand this declaration.
Yes
- 5 First name
[REDACTED]
- 6 Last name
[REDACTED]
- 7 Email
[REDACTED]

- 8 Phone
[REDACTED]
- 9 Who are you answering on behalf of?
Organisation
- 10 Organisation name
[REDACTED]
- 11 What best describes you or your organisation?
Industry
- 12 What sector do you represent?
Infrastructure
- 13 What state or territory do you live in?
New South Wales
- 14 Postcode
[REDACTED]
- 15 What area best describes where you live?
Regional area
- 16 1. Do you support the proposed guiding principles?
Yes
- 17 1.1 Please add details to your response.
I don't support 100% the proposed guiding principles.
- 18 2. Do you support the use of the avoid-shift-improve framework as a tool to identify opportunities for abatement?
Yes

19 2.1 Please add details to your response.

Not answered

20 3. Do you agree the development of a national policy framework for active and public transport will support emissions reduction?

No

21 3.1 Please add details to your response.

The people should decide when and how to use the public transport. Shouldn't be imposed by authority apart the emergency situations. The Government should have enough public transport to assure the movement of people in civilized way and anytime. Based on democracy the moving people shouldn't limited by Governments or Councils.

22 4. What should be included in a national policy framework for active and public transport and how should it be developed?

The governments to provide public transport with low emission on all cities. Then the private car to be limited in congested areas.

23 5. What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to ensure the movement of people contributes to transport emissions reduction?

Develop good public transport network. The busses and trains to be low carbon emitters.

24 6.1 What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to ensure that the movement of goods contributes to transport emissions reduction?

The goods to be moved by rail between cities and the trucks with low carbon emission to be used within cities areas night shift.

25 6.2. How would these actions address the identified challenges and opportunities for emissions reduction in the movement of goods?

Rail is more environmental friendly than the trucks.

26 7. Do you agree with the proposed net zero pathway for light road vehicles?

No

27 7.1 Please add details to your response.

I would like to get net zero emission for light road vehicles but the electrical vehicles are not enough. Electrical vehicles need electrical power and it will not be enough electrical power on market for cars. The electrical power sources are limited at this stage when it's too cold in the winter and too hot in the summer. To suppose all Sydney population has electrical cars. How and when the cars will be charged to be used in one day. Due to size of Australia is unlikely to build infrastructure to use electrical cars anywhere in Australia. It will be recommended to use indirect measures to reduce the carbon emission for light road vehicles. It's recommended to use modified asphalt with nanoparticles which remove the emission from cars on the road. The temperature of "cool asphalt" (named by us to be used in day by day production) will be more lower than normal asphalt without nanoparticle.

28 8. The Australian Government is currently developing an Australian New Vehicle Efficiency Standard and has already begun to implement actions in the National Electric Vehicle Strategy.8.1 What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to reduce light vehicle emissions?

Governments and councils to build the infrastructure to charge the electrical cars and to check the availability of electrical energy on market to be used by cars. At this time is unlikely the H2 technology to be used at any level. I don't think cannot be done.

29 8.2 How would these actions address the identified challenges and opportunities to reduce light vehicle emissions?

Not answered

30 9. Do you agree with the proposed net zero pathway for heavy road vehicles?

Yes

- 31** 9.1 Please add details to your response
Some ideas are good and I agree (use the rail system for goods and low carbon liquid fuels)) but there are some points are not applicable (battery for trucks and H2 fuel cell).
- 32** 10. The proposed pathway for heavy road vehicles relies on a mix of battery electric, hydrogen fuel-cell and low carbon liquid fuels. Rank from 1 to 3, the order in which these should be prioritised for emissions reduction.
1: Low carbon liquid fuels
2: Battery electric
3: Hydrogen fuel cell
- 33** 10.1 Please add details to your response. Why did you rank them in that order?
It's unlikely the battery electric will be used for heavy transport. It's more easier and economical viable to use low carbon liquid fuels and i don't think the hydrogen fuel cell will be the solution at thios stage.
- 34** 11. What role should low carbon liquid fuels play in the heavy vehicle decarbonisation?
Important role as explained below
- 35** 12. What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to reduce heavy vehicle emissions?
Not answered
- 36** 13. Do you agree with the proposed net zero pathway for rail?
Not answered
- 37** 13.1 Please add details to your response.
Not answered
- 38** 14. The proposed pathway for rail relies on a mix of battery electric,

hydrogen fuel-cell and low carbon liquid fuels. Rank from 1 to 3, the order in which these should be prioritised for emissions reduction.

1: Low carbon liquid fuels

2: Battery electric

3: Hydrogen fuel cell

39 14.1 Please add details to your response. Why did you rank them in that order?

Not answered

40 15. What role should low carbon liquid fuels play in rail decarbonisation?

Low carbon liquid fuel will be the most important in rail business

41 16. What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to reduce rail emissions?

Not answered

42 16.1 How would these actions address the identified challenges and opportunities to reduce rail emissions?

Not answered

43 17. Do you agree with the proposed net zero pathway for maritime?

Not answered

44 17.1 Please add details to your response.

Not answered

45 18. The Australian Government is engaging in consultation as part of the development of the Maritime Emissions Reduction National Action Plan and those consultations will also inform the final Roadmap and Action Plan. 18.1 What additional actions by governments,

communities, industry and other stakeholders need to be taken now and in the future to reduce maritime emissions?

Not answered

46 18.2 How would these actions address the identified challenges and opportunities to reduce maritime emissions?

Not answered

47 19. Do you agree with the proposed net zero pathway for aviation?

Not answered

48 19.1 Please add details to your response.

Not answered

49 20. The Australian Government has already engaged in consultation on aviation decarbonisation through the development of the Aviation White Paper and those consultations will also inform final Roadmap and Action Plan.

Not answered

50 20.1 What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to reduce aviation emissions?

Not answered

51 21. Do you agree with the proposed net zero pathway for transport infrastructure?

Yes

52 21.1 Please add details to your response.

An approach to reduce the environmental costs in asphalt pavement manufacturing is to use bio-asphalt and biochar which allow the total or partial substitution of petroleum-based asphalt binders. To produce this green binder, so-called bio-materials are used,

which come from recycled materials, co-products, or waste, such as organic matter. Biochar modified asphalt has longer life as the biochar reduces the oxidation of bitumen under action of sun x-ray. Biochar modified asphalt has better performance than normal asphalt. Our business has experience to manage the biochar as part of asphalt. The lab work has proven the biochar within bio-asphalt (bitumen obtained from bio-mass) has good electric conductivity which recommend the biochar to be used in the future roads. Biochar can be used in construction materials as part of concrete to compensate the carbon footprint from cement manufacturing.

I have more than 10 years' experience with biochar in construction materials and pavement. I work with European and American business to promote the biochar in transport infrastructure since the biochar is recognised by International Authority to reduce the carbon emission.

- 53 22. What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to reduce transport infrastructure emissions and ensure that transport infrastructure is ready for and enables low-emission transport modes?
There are few actions as Government agencies to work together with the industries (infrastructure and biochar industry) Government should consider the biochar and bio-oil (used to obtain bio-asphalt) as part of Net Zero Roadmap.
The Government to fund research group to develop new opportunities for biochar. Biochar is made by pyrolysis of recycle organic materials and help to reduce the waste in land as well. The biochar soon will be big industry and Australia needs to keep close to European and USA approach.
- 54 22.1 How would these actions address the identified challenges and opportunities to reduce transport infrastructure emissions?
The biochar and bio-oil will replace part of bitumen (asphalt) which is coming from fossil fuel sources.
Governments and local agency and councils to limited the asphalt manufacturing temperature at 140°C. Using additive which allow to lower the temperature by 30°C. Other opportunity to spray rejuvenators every year or twice per year to maintain the quality of road. The quality of road is improved and increase the life of asphalt and less bitumen will be used. The price of rejuvenator is significant lower and it is more economical than asphalt.
- 55 23. What additional actions by governments, communities, industry

and other stakeholders need to be taken now and in the future to ensure the energy mix is ready to support transport emissions reduction?

Not answered

- 56 24. How should the use of low carbon liquid fuels (LCLFs) be prioritised across different transport modes over time to achieve maximum abatement?

Not answered

- 57 25. What are the best ways for the Australian Government to work collaboratively with industry, business, governments and communities to implement the proposed pathways?

Australian Government should prepare steps (limits) and the industry to try to achieve them. Industry and business to decide how much will cost to implement the new technology. Everyone should be transparent in their work and avoid the tick the box tactics (everyone is doing what they know and nothing change but it's reported the carbon emission is lower than 10 years ago. Some change in transport infrastructure should take place even if the emission reduction is not a scope. There are a lot of actions which can be done to improve the transport infrastructure

- 58 25.1 What are good domestic or international examples of partnership and collaboration on transport and transport infrastructure emissions reduction that could inform the final Roadmap and Action Plan?

Not answered

- 59 25.2 What opportunities can Government leverage to show leadership in Australia and internationally?

I think the government should pay more attention to construction materials used to build transport infrastructure (bridge, roads, concrete, asphalt). There are a lot materials which can reduce the emission of transport infrastructure.

- 60 26. What measures and metrics should be used to evaluate the final Transport and Infrastructure Net Zero Roadmap and Action Plan?

Not answered

61 26.1 What other data and evidence could governments use and how could this offer further insights on the pace, scale and location of transport emissions reduction pathways?

Not answered

62 27. Do you have any feedback on the proposed review process?

Not answered

63 28. Do you have any further feedback on the Consultation Roadmap and proposed pathways?

Not answered

64 28.1 Is there anything missing? Are the sections appropriately integrated? Is the Roadmap appropriately ambitious?

Not answered

65 29. Is there any further information or documentation that you wish to be considered with your submission?

Not answered

66 Would you like to upload a document?

Yes

67 Have you removed any identifying information from your submission?

Yes

68 Upload a submission

Biochar_and_bio_oil.f74a992a.pdf

69 Upload a submission

Not answered

70 Upload supporting file
Not answered

71 Upload supporting file
Not answered



USBI • [BIOCHARCONFERENCE.COM](https://biocharconference.com) • FEB. 12–15, 2024



Biochar and bio-oil as bitumen replacement

Sustainability Asphalt Concrete Solutions PTY LTD,
Australia

ASPHALT

- Asphalt is a mixture of aggregates, sand, filler, bitumen and, possibly, some extra additives.
 - Aggregates (also known as mineral aggregates) are hard, inert materials (e.g. gravel, crushed stones, slag or rock dust). Fillers are also inert minerals but in the form of dust, they are used to fill voids in coarser aggregates to increase the stability, density and toughness of the conventional paving mixture;
 - Recycled Asphalt Pavement;
 - Bitumen



ASPHALT

- There are three types of asphalt classified based on the temperature under which the material is submitted in the paving process.
 - hot-mix – 165 - 175°C
 - warm-mix – 125 - 135°C
 - cold mix – used without heating
- Asphalt industry uses relatively cleaner materials as:
 - low emission warm asphalt mixtures;
 - waste crumb rubber – modified asphalt;
 - Recycled Asphalt Pavement;



BITUMEN – PETROLEUM ASPHALT

- Bitumen – is a product made from petroleum and is considered to be a non-renewable fossil fuel energy resource and its production process consumes a lot of energy (coal, electricity, diesel, gasoline, heavy oil and natural gas, etc.) and issued a lot of greenhouse gas (carbon dioxide, nitrous oxide and methane, etc.)
- The European Bitumen Association released the life-cycle inventory for bitumen in 2020, showing that producing 1 ton of asphalt requires energy consumption of 2830.69 MJ and releases greenhouse gas 189.12 Kg CO₂e (Eurobitumen, 2020).



ASPHALT PERFORMANCE TESTS – RUT DEPTH

- Rut Depth - The determination of the deformation resistance of asphalt mixes uses a wheel tracking device which consists of testing an asphalt sample by moving it back and forth under a loaded rubber rimmed wheel. The depth of the depression left by the wheel in the asphalt sample is monitored and the final depth reported.

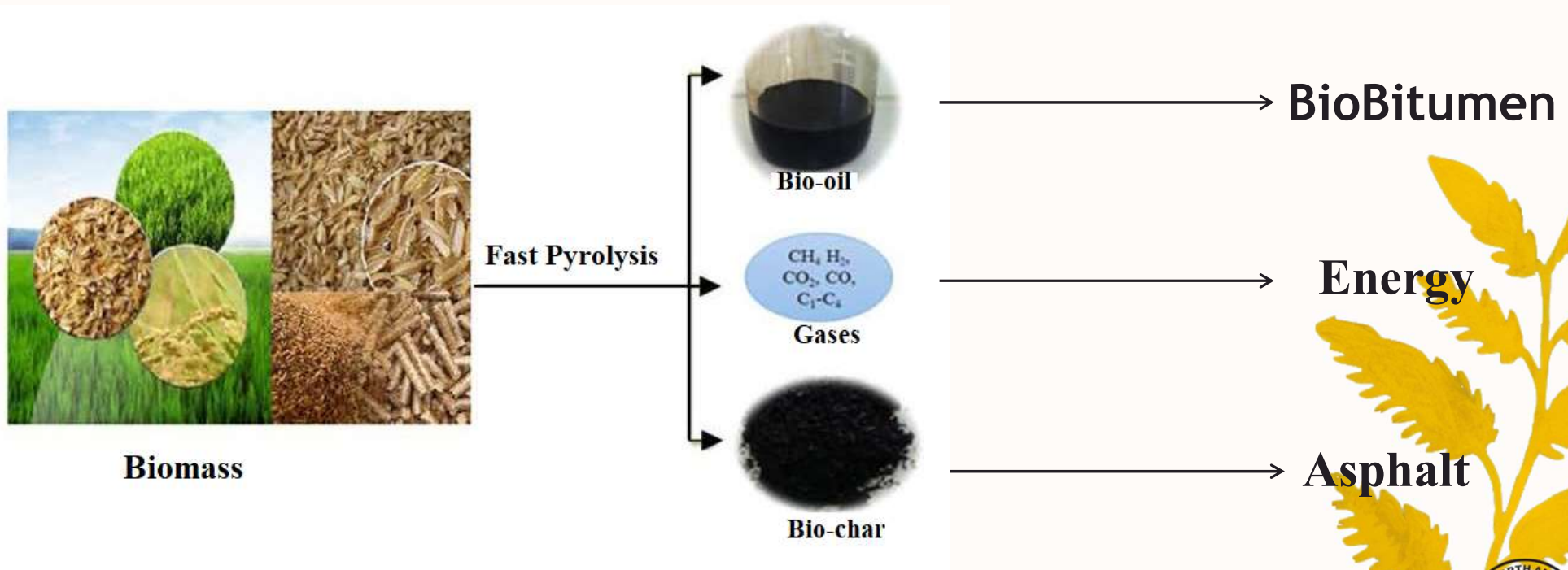


ASPHALT PERFORMANCE TESTS – INDIRECT RESILIENT MODULUS

- The indirect tensile strength test is the primary test carried out to characterize the stiffness of a bituminous mixture.
- One of the original stiffness/modulus measurement tests, where the load is applied in the vertical plane while the strain/deformation is measured in the horizontal plane. When applying the load in the vertical plane, the horizontal plane experiences extension (indirectly, tension); where this test gets its name from.



BIOMASS VALORISATION TOWARD SUSTAINABLE ASPHALT PAVEMENTS



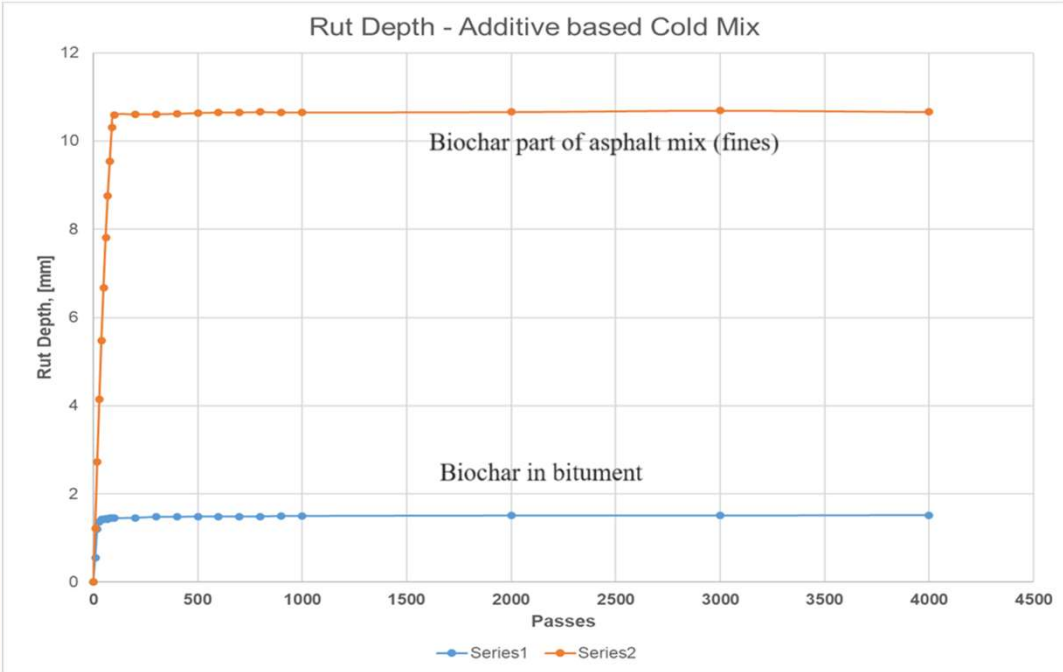
BIOMASS IN ASPHALT INDUSTRY – CO2 GETS MOVED FROM PLANTS TO ROAD

- **Biochar used as asphalt modifier** – improve the asphalt performance
 - Hot Mix Asphalt
 - Cold Mix Asphalt – additive based

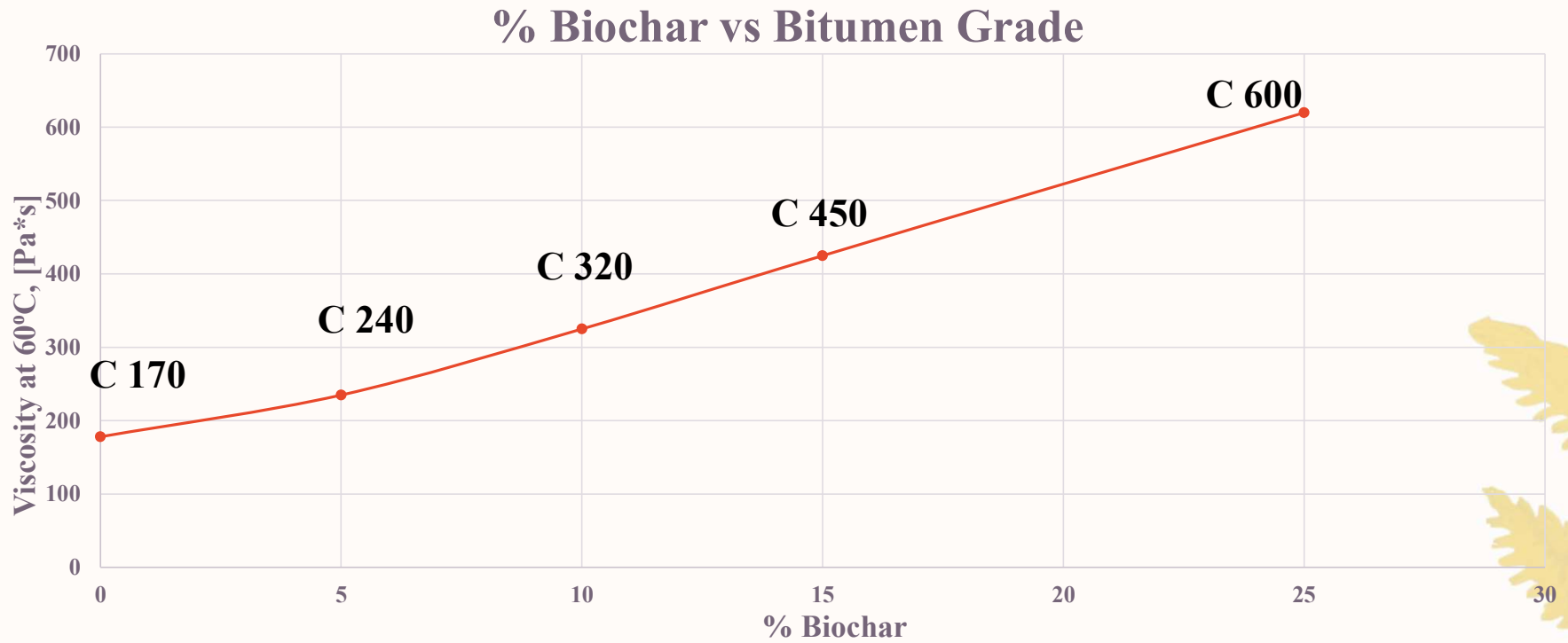
- **Bio-oil used as asphalt replacement**



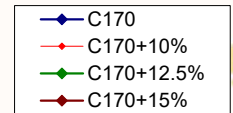
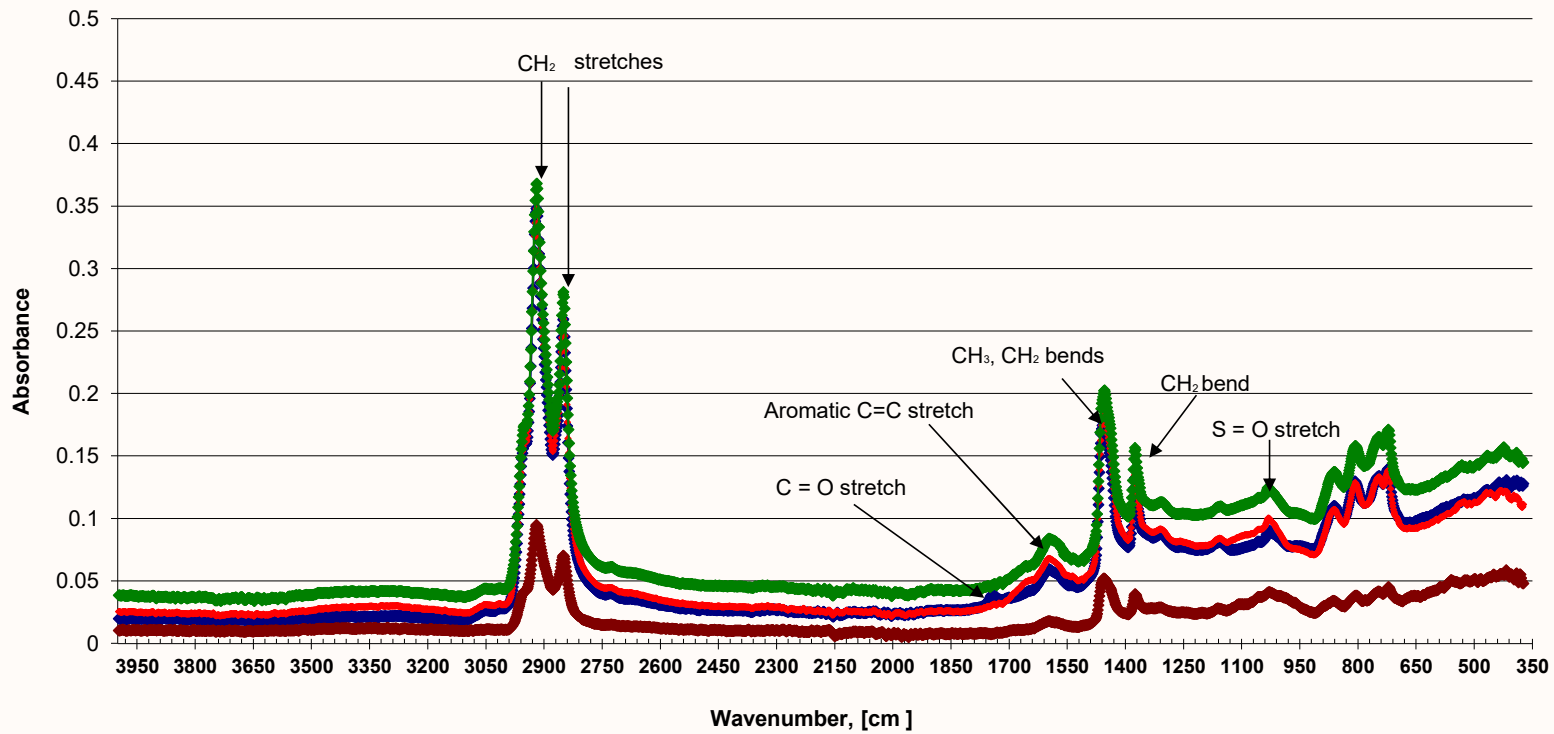
BIOCHAR – COLD MIX (additive based)



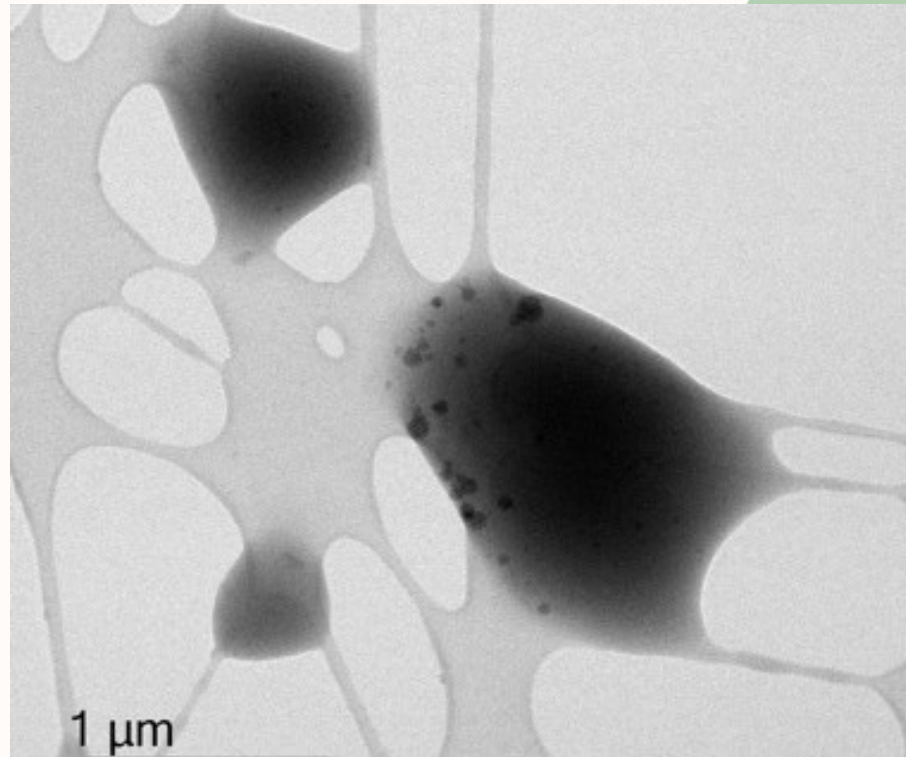
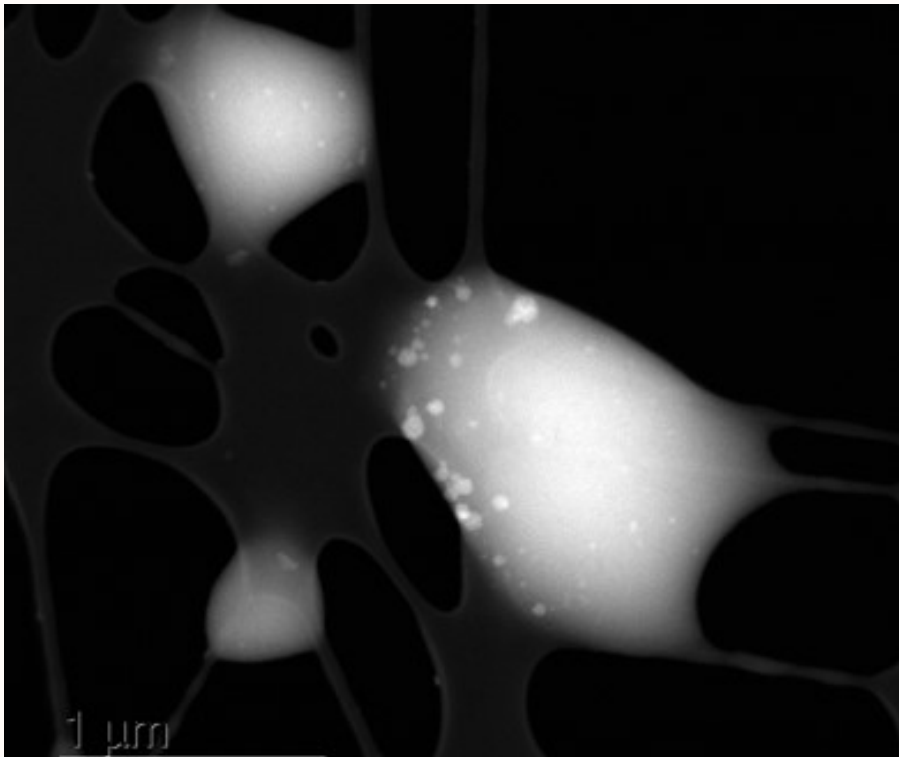
BIOCHAR MODIFIED ASPHALT



FTIR – BIOCHAR MODIFIED ASPHALT



SCANNING TRANSMISSION ELECTRONIC MICROSCOPE

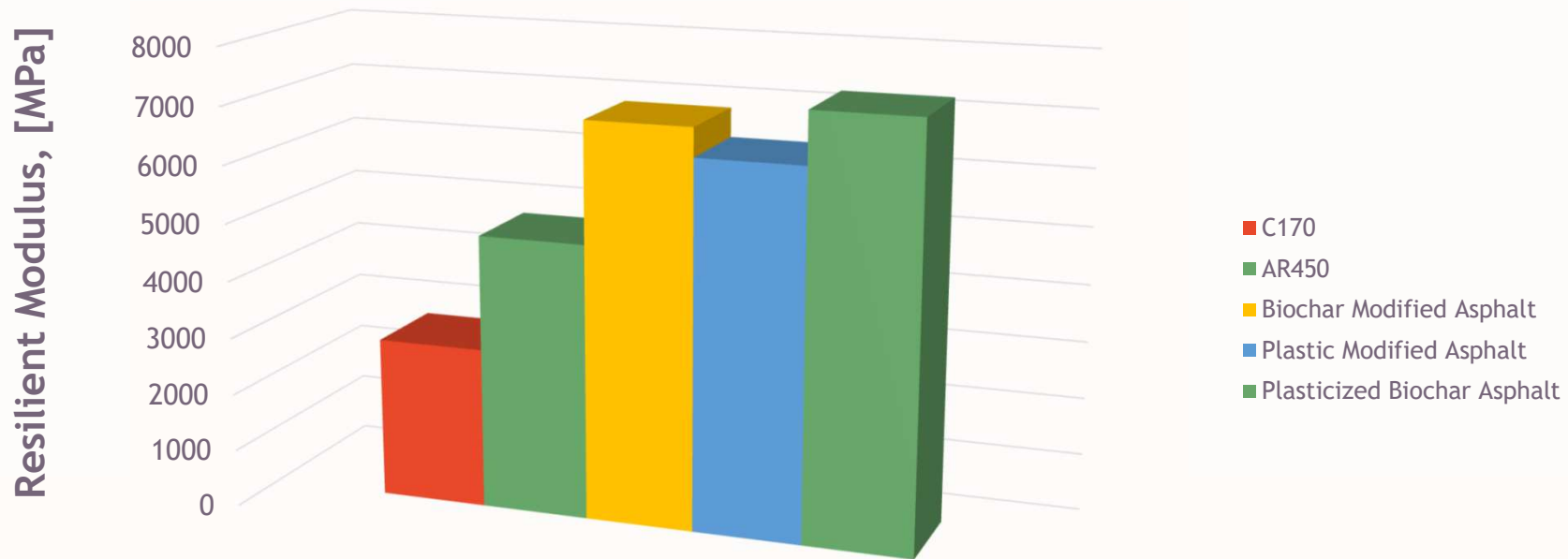


PLASTIC ENCAPSULATED BIOCHAR

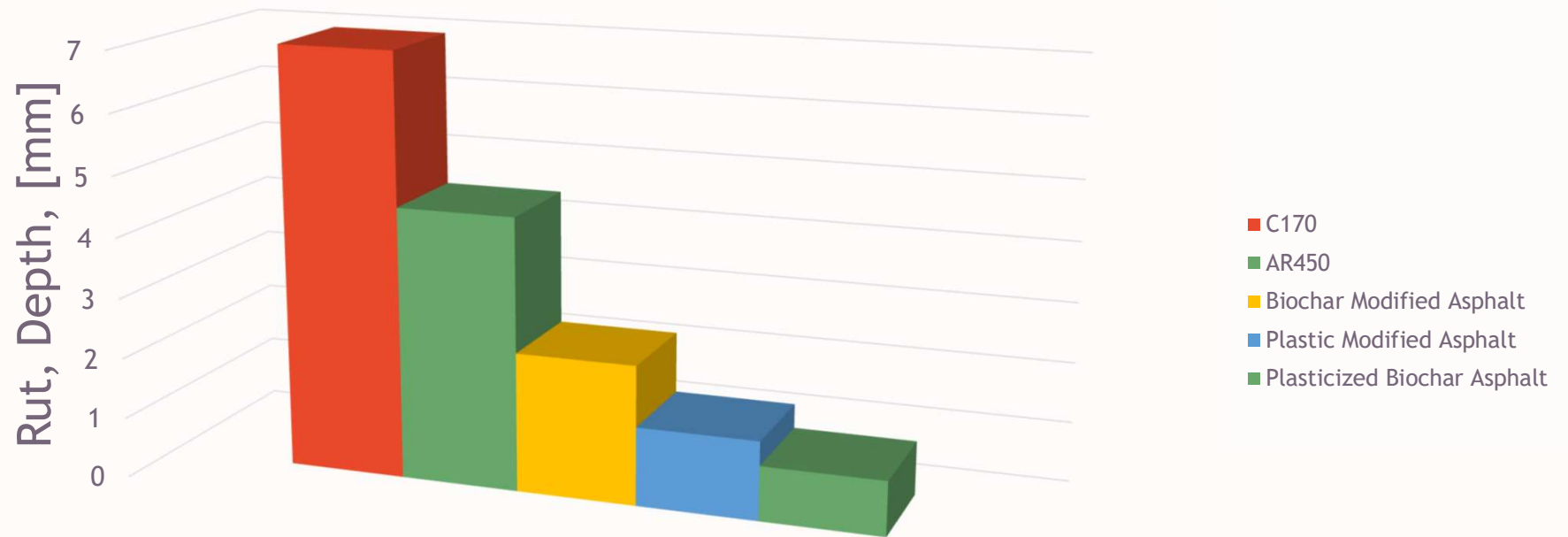
- To prevent any dust inhalation the biochar was encapsulated within recyclable plastic.
- Various amounts of biochar was encapsulated in recycle plastic.
- Recycle plastic is propylene based.



Resilient Modulus



Ruth Depth at 60°C after 10000 cycles



BIO-OIL – BITUMEN REPLACEMENT

- 100% non fossil bitumen made using bio oil from bio-gas business
- Torsional Recovery – 50%
- Softening Point – 94.5 °C
- Viscosity @ 165°C – 2.5 Pa*s
- Penetration – 32 uP



THANK YOU



• THANK YOU

