

physical properties of organic compound essay sample

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Boiling point is the exact temperature that the state of compound change from liquid to gas, which need to break the intermolecular forces. The stronger the intermolecular forces, the higher the boiling point. Since straight chain alkane, alkene and alkyne only experience dispersion forces, the compound with more carbons have higher boiling point as more carbons contribute more forces. Branched chain alkanes have lower boiling point than the straight chain alkanes because the branched alkane have a shorter chain length, which makes it pack not as close as straight alkane. For ether, it has one oxygen; there are polar bonds.

However, since the functional group is R-O-R', for oxygen the VSEPER shape is linear so that the polarity canceled out. The compound is still non-polar, and there is only dispersion force. Ether has higher boiling point than alkane, alkene and alkyne because oxygen has higher electron negativity. Cis and Trans: cis usually have higher boiling point because the side chain may have dipole (polar bond) which makes the molecule experience dipole-dipole forces; Trans also have polar bond, but due to its structure, the polarity may canceled out. Alkane

Medium boiling point group: ketones, aldehydes, amines and esters This group of compound are all polar compounds, in other word, the strongest intermolecular force is dipole-dipole, which is much stronger than dispersion. For ketones and aldehydes, they both have oxygen, but oxygen is not bonding with hydrogen directly so that they cannot hydrogen bonding. Ketones are more polar than aldehydes because there are two CH₃ groups bonded with the C= O. Amines have a similar situation, but instead of

oxygen they have nitrogen. Because nitrogen has lower electron negativity, amines are less polar. Esters are sort of unusual because the rotation about the C-O-C bond has a low barrier caused esters structurally flexible. They have even lower boiling point than amine.